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# AVIATION

*The Oldest American Aeronautical Magazine*



## *Twin Wasp Junior* **BRINGS LAND SPEED RECORD BACK TO AMERICA**

Back to America — at the rate of 352.46 miles per hour — came the world's speed record for land planes when Howard Hughes flicked his special racing plane across an official three kilometer course. This spectacular record was achieved in a specially designed low-wing monoplane powered by a 14-cylinder Twin Wasp Junior engine.

### **WASP & HORNET ENGINES**

PRATT & WHITNEY AIRCRAFT DIVISION OF UNITED AIRCRAFT MANUFACTURING CORPORATION, EAST HARTFORD, CONNECTICUT

FIVE CONTRIBUTIONS  
TO *Better* PERFORMANCE

By noteworthy achievements in foundry practice, Alcoa Aluminum cylinder heads have that growth decreased its spacing, and consequent increase in cooling area, without which modern horsepower would be unattainable.



The remarkable performance record of modern pistons is a result of the development of a special forging process and new alloys of Al-Si-Mg. These pistons are lighter in weight, lower in coefficient of expansion, and possess superior bearing qualities and thermal characteristics.




Alcoa Aluminum forging technology produces lighter forged crankshafts—wrought metal—which are capable of handling the increasingly increased stresses of modern engines. For smaller engines, Alcoa Aluminum forged link rods, self-lubricating, cut both service and overhead costs.



In the geared engine, the nose is a vital stress-bearing member. Akzo Aluminum has developed special alloys and forging techniques on special equipment, which produce ones of desirable lightness and necessary strength.



Another major contribution by Alois Abramson to flying performance and efficiency is the development of the method for forming the controllable-pitch propeller blades. Pioneers of this type, new standard equipment on all major transport lines, eliminate complications formerly necessary on fixed-pitch blades, allowing engines to be operated at maximum efficiency, both in take-off and in cruising. A further example of success: 3,885 Gulf Streamers, 30,000,000 miles.

ALCOA  ALUMINUM

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# AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

*John P. Hoff, Vice-President*

Edward P. Turner, Editor

L. van E. Saville

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### Special Nurses

David J. Levine

David Wexler

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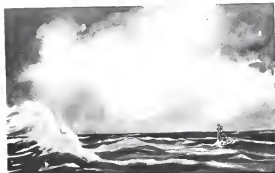
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## LONG-RANGE SKY PATROL

Before the human eye can detect a mere speck on the horizon, the new Consolidated Long Range Patrol Flying Boat can go to sea, meet the enemy, and accomplish its mission. With our extensive coast lines patrolled by these giant flying boats in sufficient numbers, we need never fear invasion of our shores.



CONSOLIDATED AIRCRAFT CORPORATION, SAN DIEGO, CALIFORNIA



# Aero Mobiloil Chosen

BY PAN AMERICAN FOR TRANSPACIFIC

"TRICO—BONOLITE—MANILA . . . when the "Clipper" clears the Golden Gate, her Pratt & Whitney engines are lubricated by Aero Mobiloil.

And at every hour in Pan American's chain, reserves of Aero Mobiloil await the arrival of the pioneering transpacific "clippers."

In private flying, as well as in scheduled transport operation—Socony-Vacuum Aviation Products provide unrivaled performance—and Socony-Vacuum distribution facilities assure ample and continuous supply.

Ask your airport dealer to supply you with these dependable aviation products.

See your distributor where you see this sign. It stands for fine performance—and usually service from the dealer.

AERO MOBILGAS—MOBILGREASE—AERO MOBIL-OIL

**Socony-Vacuum Oil Co.**  
INCORPORATED



STANDARD OIL OF NEW YORK DIVISION • WHITE STAR DIVISION • TANKER DIVISION • WHITE OILS DIVISION

Transmitter and  
Receiver combined  
weigh less than  
a suitcase



Western Electric  
Midget Transmitter  
Weighs 11 pounds

Western Electric  
Double Duty Receiver  
Weighs 11 pounds

**MIDGET TRANSMITTER:** Small, light, rugged—test flown and reliable. Provides three types of transmission: 100% modulated PHONE, CW and MOW, selected by switch. Easy to operate; single control (hand or remote) and push-to-talk microphone. Frequency range 2000 to 7000 KC—quick shift from 2145 to 3120 K.C. Operates from 12 volt plane battery—uses only 2 tubes of newest Elementary pentode type. Built-in relay permits using one antenna for transmitting and receiving.

**DOUBLE DUTY RECEIVER:** Designed for private planes. Covers both broadcast band (550 to 1500 KC) and broadcast band (550 to 1500 KC). Uses only 3 tubes. Special static reducer assures clear reception at all times. Operates from 12 volt plane battery. Used by major transport lines as a reserve unit.

Both Transmitter and Receiver were developed by Bell Telephone Laboratories—the leader in sound-transmission engineering. Full details from Western Electric, Dept. 297 A, 195 Broadway, New York.

**Western Electric**

Western Electric  
in Canada

TWO-WAY AVIATION RADIO TELEPHONE AND TELEGRAPH EQUIPMENT



## WRIGHT ENGINES power the *Great Silver Fleet*

Eastern Air Lines' "Great Silver Fleet" is powered exclusively by Wright Whirlwind and Cyclone—a tribute to the quality construction and dependable performance of Wright Aircraft Engines.

Wright Whirlwind 410 h.p. Engines power Eastern Air Lines' fleet of new Lockheed Electra transports. These 200-mile-an-hour planes complement "The Great Silver Fleet" of giant Douglas Airliners, each powered by two Wright Cyclone 750 h.p. Engines.

The Wright Whirlwind-powered Lockheed Electras have been placed on regular schedules between New York and New Orleans, and Chicago and Miami—with intermediate stops shown on the map. These new schedules allow the high-altitude Wright Cyclone-powered Douglas Airliners to hold express schedules over long distances on Eastern Air Lines' great transportation system.



Map of Eastern Air Lines System



**WRIGHT**  
AERONAUTICAL CORPORATION  
PATERSON  
NEW JERSEY

A DIVISION OF CHRYSLER CORPORATION





## EASTERN AIR LINES USES GOODRICH TIRES FOR EXTRA LANDING SAFETY

100 LANDINGS PER DAY ON EASTERN'S FAST PLANES PROVE DEPENDABILITY OF LOW PRESSURE SILVERTOWNS

Quitting eastern, southern and central states 17 in the day, plus that Eastern Air Lines has one for each of the states from Maine to California 100 times a day. It means 100 landings every 16 hours—and not ordinary landings at all. For when, in winter, Eastern Air Lines' planes take off on hot tarmac Florida roads only to come down a few hours later on snow in New York! Here is a sure test of the tire—no other proof that Goodrich Airplane Silvertowns are adaptable to any ground conditions and hence safer.

### Three-way safety

Along with a lighter, treadbreaking tread—and a better, stronger casing—Silvertowns give you all the advantages of low pressure construction. The ability to "give and" rough fields. The ability to deflect more and thus provide a larger contact area for every landing and takeoff. And Silvertowns can take plenty of punishment.

When landing alone, plus safety and air flow chosen Goodrich Airplane Silvertowns, extremely low slips and this better protection and extra landing safety, too. See your nearest Goodrich dealer without delay, or write Dept. 604, American Division of the B. F. Goodrich Company, Akron, Ohio, for complete information about Goodrich Airplane Silvertowns and over 40 other Goodrich quality rubber products for airplanes.

WHENEVER YOU FLIGHT, SEE HOW MANY TIMES YOU TAKE OFF ON GOODRICH AIRPLANE SILVERTOWNS



Capt. C. W. Brown, Operations Manager, Eastern Air Lines, reports: "Goodrich Airplane Silvertowns are one of the company's high speed Douglas Transports. No matter how rough the terrain, we wonder they give each month, complete landings—more safety in planes and passengers."

## Goodrich Airplane Silvertowns

THE SAFEST AIRPLANE TIRE EVER BUILT

Over 40 Rubber Products for Airplanes—Inflatable Tires—Tail Wheels—Aircraft Shoes—D. 3009—Methyl Rubber—Rim—Discs—Wheel—Airplane Cowl—A. Complete Set of Rubber Aircraft Accessories

# DOUGLAS



## MORE PAYLOAD FASTER

AT LESS COST

## Douglas Transports Score 7 Months Economy Record

URPASSING anything heretofore experienced, Douglas equipped airlines in the United States report for a first seven months of 1935 vital increases in operating expense per previous equipment. Item for item, the DC-2 average cost of operation is 29% less per passenger mile than equipment it replaced, yet its speed is approximately 100% faster.

Douglas Transports now fly

54,355 miles every day for U. S. airlines—27% of the total miles flown, although the 58 Douglas Transports in American service represent only 13% of the total number of airplanes in use.

This means an unparalleled revenue return in air transportation, as Douglas Transports are in the air on average of 6 hours, 19 minutes every day of the year. Douglas Aircraft Co., Inc., Santa Monica, Calif.



Col. Charles A. Lindbergh, Bruce J. Tilly, Grace Larson, Graham P. Greenlee and other Pan American officials boarding the China Clipper

"We know, as does the Marine organization, the risk—not only in money—but in effort and courage—of producing this great ship. The fact that it has been successfully developed in three short years is a fitting tribute to the aviation industry in America and to the whole Marine organization. The China Clipper will be ready for the early inauguration of the world's first scheduled coast air service—to link America, Hawaii, the Philippines and the Orient."

—JUAN T. TRAPPE, President of Pan American Airways, at a radio address on October 2, 1935, when the China Clipper was named and winged

## THE CHINA CLIPPER

designed and built by  
THE GLENN L. MARTIN CO.  
BALTIMORE



AVIATION for November, 1935 \* \* \* \* \*

## Future of the Pursuit

A BRITISH VIEW

By Major Oliver Stewart

*Hardly pessimist for aerial tacticians is—"Has the single-seater any future?" The author—a keen observer of military affairs abroad—feels that it has. In spite of a steady loss in speed advantage over bombers and "multi-place" fighters, the advent of the "motor-cannon" has given the pursuit a new lease on life.*

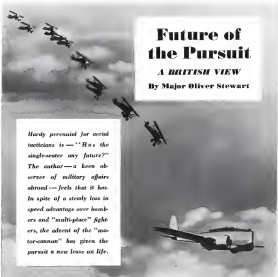


Illustration by ARTHUR

AMONG believers in the future of the single-seater pursuit airplane there are two schools of thought. One holds that the single-seater will always possess a sufficient performance margin over the multi-seater to allow and to return the advantage in combat. The other believes a gradual diminution in the performance margin between single-seater and multi-seater, but believes that certain armament developments (with which I shall deal later)

will enable the single-seater to retain its position as the primary fighting machine. Let us examine first the performance margin question as it is looked upon in Europe.

It is necessary to refer back as far as the year of 1916 for a firm starting point in the discussion because that is the only period during which full scale air fighting has taken place. For a complete picture, rate-of-climb and power of maneuver ought to be considered, but it

must mean speed alone be taken into consideration the picture will not be very much distorted. (Readers will recall that Commander Shivey recently discussed his concepts of the ideal pursuit airplane in AVIATION, October 1935.)

In 1916 and 1917 the margin of speed of the single-seater fighter over the bomber was approximately 50 per cent. The bombers were doing about 80 m.p.h. and the fighters were doing about 120 m.p.h. It was found in actual air fight-

ing that a 50 per cent margin was only just enough to enable the fighters of just one machine to attain the relative air combat. And below the altitude there is no more helplessness towards than the machine which will all in all go down and the machine straight forward in the line of flight. It was found that a 50 per cent margin in speed would allow the fighter to escape, break off and re-engage a sufficient number of times to give it a fair chance of victory. On one level flying at 4000 ft. the machine which flies the bomber and that 40 miles was just enough to allow it to employ typical pursuit tactics. Probably the engagements would not engage more than three times during which time the theoretical distance the pursuit machine could go beyond the bomber would be 10 miles.

#### Today's comparisons

Today, with the bomber arriving at 200 m.p.h., the pursuit machine's speed now goes should be sufficient to allow it to overtake 25 miles more than the bomber in 100 seconds. The question—and I know mean that it is a theoretical one—is that when the bomber comes a given distance on a set course, the fighter must be able to overtake and distance and then double back, half that distance. In combat it is not actually double back. It probably does, some do have. But if one attempts to reduce the problem to a simple form, it is necessary to assume double back. To achieve an equal number of engagements with bombers of different types, a constant percentage speed margin is needed by the fighter. The war materialized that 50 per cent was the most realistic margin. Can the present machines retain such a margin?

Already bombers are doing 200 and 220 m.p.h. and types like the B-29 are coming forward. The U. S. Air Corps specifications for bombers have been fixed. Douglas and Martin retained complete an A-26, called for one speed up to 280 m.p.h.—B-24. To compete with a 200 m.p.h. bomber the pursuit airplane must be capable of 300 m.p.h. That is not impossible, and most are capable of 300 m.p.h. are now being built for the air forces of more than one country. That was, bomber speeds reach 300 m.p.h., which are currently well, pursuit speeds, according to our theoretical reasoning, should now be 450 m.p.h. or well into the region of the Galton shifter world's speed record. It began to look doubtful if current airplanes will be able to achieve such speeds. If they are unable to do so their loss of usefulness will be as no real, unless there is some sort of development in tactical methods. In Europe there are some of such a tactical development. It is based upon armament changes.

#### Flying cannon

Other than the machine gun has been the weapon with which airplanes engage one another. It has proved to be a required in weight of projectiles and rate

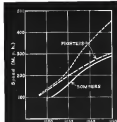


Fig. 1. Pursuit and bomber in a study of the progress of average performance of bomber and pursuit. Heavy lines show actual and probable development. The light lines show the speed which would have to be maintained by the pursuit to maintain the same tactical advantage over the bomber that was maintained on velocities of the case of the case of 1934-35.

of fire. The "water-cooled" or 100 m.p.h. or less of a better case, was tried during the war of 1914 by the French pilot, Guyotier in a Hispano-Suiza military Spad. Guyotier used a 37 mm cannon, which could fire one shell. The machine's speed was relatively low and although he brought down one or two enemy airplanes with his cannon, he did not do it and returned to his base. The cannon gave no advantage over the machine gun and had several disadvantages. This cannon-like shell could comparatively records in the machine's development have been made with the machine itself and with the method of employing it in aerials.

I cannot discuss all the progress that has been made in detail but I can mention the outstanding points. First of all the record of the current is below, as it was in the early machine, in the engine. The engine is mounted in the Yee of an engine and fires through the propeller hub—the engine giving moment the hub shaft position possible. (Obviously this type of arrangement is not adaptable to radial engines—B-24.) The engine is a two-stroke anchored rigidly to the frame of the engine. It is an "interceptor" in the sense of the engine of the engine. And the record is therefore—partly of course by the tailoring machine—but also by the weight of the engine.

The cannon is of 38 mm in calibre and used in the case I have in mind is a rotary but which is not "locked" as a rule but at the time of firing. Most important of all the cannon has a very high muzzle velocity and can fire at the rate

of 280 rounds a minute. The machine's velocity is such that as always that trajectory is possible for 300 yards range.

#### Cannon vs. gun

Now compare the more common equipment with a pair or a group of four machine guns. Machine guns fighting, pilots will agree that the maximum effective range of a machine gun is at least 300 yards. Now the 20 mm cannon with its flat trajectory should be accurate up to 800 yards under the conditions of aerial combat. Its shell is not larger—only about 8 in. in length—but it moves a lot about a yard ahead in a wing, so one has to think to escape or being down as simple.

Clearly the ability to escape at stages at which only accurate and effective return fire is possible gives the pursuit pilot an enormous advantage, an advantage in great that he would probably be able to sacrifice some of his speed to gain.

For purposes of fighting, the machine gun group holds its place unchanged. The reason would be of little or no value in a dog fight. But assume that the pursuit machine is engaging a leading bomber. The pilot can "off" behind the bomber so far away that he is out of effective range of their rear machine guns and he can then use the great range of his cannon to shoot at them with a good chance of obtaining hit. The bombing characteristics of the present state of knowledge, is enough to reply because an essential of the high speeds which are needed is that it is impossible to get the mass of the engine. No final gun was made to be able to do any and even if it were, there is no more of sufficient size in the rear gunner's compartment to which the machine is. The present machine armed with a group of three or four machine guns and one cannon engine of 20 mm looks like the most effective fighting weapon of the future.

**Future fighter**

As to the introduction of such machines, the French are here in equipping a squadron with them, and in England the Fieser, cannon plane has been produced and has proved capable of high performance and good powers of maneuvering. It is a biplane with a top speed of well over 250 m.p.h., and it can be turned on

the wheels quickly while it is doing. The pilot's cockpit is beautifully arranged, and is one of the most comfortable I have seen. The maximum capacity of the machine and four machine guns (two on the lower wings and two in the fuselage). All the guns are forward of the pilot and look by conventional air

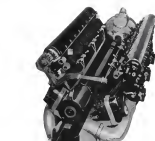
At the pilot's right hand side is a projection panel for determining the gun groups that will be used, and a cannon safety switch. The machine gun controls consist of small up and down buttons by which the pilot can cut in or out any of his guns. The actual firing is done with these small push triggers on the top of

the control column. They fall easily to the thumb. The top two are for the machine guns, each one firing a pair of guns or one gun, according to the pilot's selection. The lower trigger fires the cannon.

I have been at pains to discover if there are any serious faults in this machine. But I can find none. A machine was speeded due the cannon would wreck the airplane after a hundred rounds or so and had been used for the French government, which has done some carefully controlled experiments, has not found any fault of this kind. With the machine's belt mechanism it is said to be almost as good as the trigger, but that is no serious disability and the engine keeps the guns warm at all times.

#### A new time on life

If I may say so, up the present status of the present airplane, I could say that it is being found increasingly difficult to provide a safe and sufficient performance capacity to enable it to engage bombers successfully with machine guns, but that the use of underpowered, larger caliber, high muzzle velocity guns firing straight forward through the propeller shaft is becoming practical. These larger caliber guns have given the pursuit airplane a new lease of life and I shall expect to see them in use in all the world's leading air forces within three or four years.

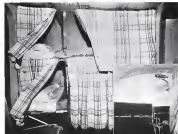


Two versions of pursuit increased. Description of machine gun shot forward is loaded by the Lewis (fixed) with machine gun sight, from left. The "water-cooled" machine gun mounted on the top of a fixed cannon engine, after which intervention through a bellows, gas delivery pressure shaft. This particular mounted on a Hispano-Suiza 20 mm engine.



# China Clipper

*Some interior views of the Martin 130 flying boat soon to go into regular service on Pan American Airways' 9,000-mile skyway to the Orient*



Left: Two of the airplane berths made up as they will be on the overnight flights between Miami and San Francisco.

Below: A view of the big lounge room. Note the left, new typical of the 12 throughout the ship. Extra-large heads the lounge into two sleeping rooms for married couples.



Below: Louis Pridemore, Pan American's chief engineer, demonstrates the new four-burner stove. When set in use they hold four or five 100-watt light bulbs, warm as a table in the airplane lounge.



Photo 10



Photo 11

Above: At work in the lounge main, Harold's construction of the new Del Corral's development. Harold's construction secretary and some other passengers are working on the lounge main.



Left: Engineer Officer Chas. W. Wright in the engine room near the passenger cabin. Above him are the power and hydraulic lines and the engine which runs the turbine of the four 100-hp. Pratt & Whitney engines.

Below: Chief Radio Officer and Chief Officer Robert Chas. W. Wright. Below them the radio room and the engine room.



Photo 12



## Hitch Your Airport to the Stars

By Major C. C. Moseley  
*President, Airport Industries*



The Sidewalk Cafe. An example of how an old Ocean View is a great location for an

restaurant. Modern easy-to-operate efficiency of an airport can be kept within this vintage spot.



The Cockpit Bar. A much delayed photograph of a 1945 instrument board against the more usual picture of an instrument and how it looks on the inside mirror. The cockpit bar and the entire building have been built into the airport. The restaurant is the problem of making sure the view can be kept by the building.

**D**EVOTED WIFE: John, we are going out for dinner tonight.

YOUNG BUSINESS MAN:

"Where?"

DW: "To Grand Central Airport."

YBM: "Why?"

DW: "Clark Gable is going to be there."

YBM: "How do you know?"

DW: "I heard it over the radio."

YBM: "Yes, dear."

Then radio and television compete to get the public to our airport, make them realize that it is a recreational center. And why shouldn't an airport profit by satisfying the same needs that have been filled by motion picture theaters, restaurants, bars and the higher types of social dependencies?

As Grand Central Air Terminal we are trying out some of these ideas and not have double parking outside the administration building almost every night. It has helped us out of the red ink and we gain along our favorite with the thought that it may be of some value to other airports.

Target for our radio barrage is the lone suffering, jaundiced—sensitive and right-out driver of the domestic automobile and social director and purchasing agent of the well acquainted family. It is in the first two of these categories that our broadcasts are extended to influence. If his interest is in the lot of airplanes looked for passage on the airport line, especially from Grand Central Terminal, we can get ourselves on her social roles and not her car which is in our domain, so we have accomplished the first of our purposes. The appeal to the purchasing agent location may be made later.

### Creating the incentive

Although women's work is more done, it is more likely to be suspended for her favorite radio program. For this reason we make our announcements as close as possible to the station's most popular offerings. Usually we can get fairly complete airline passenger lists for late afternoon departures by 2:30 p.m. If a "big client" makes a late reservation after our last broadcast has been used the station will usually give us a special extra news flash for general build-up. Our broadcasts are 100 word announcements and their schedule of frequency was determined after several

weeks of experimentation. After trying every hour, every day in the week, we standardized on two a day—morning between 10 and 12 o'clock, afternoon between 2 and 5 o'clock.

Announcements are always closed with the reminder that the very celebrities who will arrive or depart that day are very likely to partake of cocktails



Major C. C. Moseley



in the Cockpit Bar or dinner at the Sidewalk Cafe. This same appeal has made many a Hollywood restaurant or drink dispiriting. Why shouldn't we use it too?

We do not restrict our passenger competence to the abilities of the cinematographic art. While it is true that they draw the largest crowds, we can do pretty well with a radio program, a penlighter, or a momentarily publicized position or professional man.

### Attention all airports

To matter how direction is handled may have become in guiding his route past dress shop, hairdresser and jewelry displays and electrical appliance bargains, he cannot avoid the temptation we have to offer him to get to the airport.

As he passes through the street entrance the colorful stands of the Mexican Village come up ahead of him. To reach the airplane ramp beyond he must guide her between two Mexican stands. If he is on the alert, and can read the room-like signs of the passenger airplane, he will see the sign which reads: "Welcome to the airport."

As he passes through the street entrance the colorful stands of the Mexican Village come up ahead of him. To reach the airplane ramp beyond he must guide her between two Mexican stands. If he is on the alert, and can read the room-like signs of the passenger airplane, he will see the sign which reads: "Welcome to the airport."



to get there. At this point some visitors give up.

But our hero refuses to be deflected so easily and he guides his wife skillfully in the direction opposite to that in which the arrow points, and goes the long way round. But wait, the Cockpit Bar has an entrance opposite the bar and just beyond that is the Sidewalk Cafe. Of course he could turn away from all that but the public address system is there to remind him of the Cockpit Bar, the Mexican Village and the Sidewalk Cafe.

The lobbies of these lobby hotels are not the result of happy chance. Nor is the arrangement of the first and we have said. It is the result of a careful study of the traffic flow and has been developed with all the care that would be necessary to get a satisfactory wing. And if you don't think airport is important we could show you

Mexican market sales figures before and after.

All this applies only to new visitors at the airport. After they have seen pictures of our plane's power of handling trucks, it becomes difficult to keep them away. They come back for more and bring their friends.

But it was not over this. And that brings us to the history of our airport restaurant. It used to be a concession operated by a large chain with branches in many national states and other public places. For years it suffered along under an unbearable deficit, awaiting the happy day when the concession contract would expire. In some of the concessionaire would not renew at any price. After refusal from all who might have taken it over and many changes rights not denied to agents it occurred.

### The restaurant business

Without knowing anything about the restaurant business we applied actual basic principles. We removed all customers with air-cooled teeth and called the Central Carling House for a few drinks and delicious status quo really wanted to go to work. We found an excellent manager who had spent a lifetime in the restaurant business.

ness and, but not least, we obtained a good shot, and served well cooked, very food and the best grade of coffee. It didn't take long to prove the value of such methods. Our restaurant paid a profit in the first month of operation and business has steadily increased since then.

That is the story of our non-mechanical enterprise. They are designed to get people into the habit of looking at our airport as a recreational center, but we do not overlook the fact that what all we are primarily is the aviation business. We take every opportunity to point out the air transport services, the schools, the shops and the manufacturing at Grand Central. Visitors are encouraged to see all they can of the aeronautical phases of our activities.

We operate the consolidated ticket office located in the lobby of the terminal building; we distribute for Sausage Airplane, Wright and Lycoming engines, parts and accessories, operate an engine repair station, and retain gas, oil, motor and other service privileges. Other activities on the field are conducted by individuals who

lease their property from us and are subject to strict regulatory measures which are strictly protective. We avoid all forms of direct competition among our tenants. Including restaurants we operate no fewer, there is but one flying school, one airplane and engineering school, one parts and accessories dealer, one plane repair station, one engine repair station, one propeller repair station, one instrument repair station, one instrument sales representative, one tool plane dealer. Thus our operators are protected and protected in turn; there is enough business for all, all of them are making money and all pay their rent on time.

#### Helping the operator

By giving customers rights we have the advantage of being able to choose our tenants. From our past experience, we have found that the operator who extends unlimited credit or uses the big pocket method of bookkeeping soon goes out of business and can pay no way. We therefore have extended great care in choosing tenants who conduct their operations on sound business principles. We have been willing to go

more than half way to assist a reputable operator to meet our standards. In one case we assisted one of our two bookkeepers to the task of developing an accounting system for a new tenant, who was a legitimate operator but who was in difficulties due to the lack of a business-like accounting system. We started off another desirable tenant by furnishing him with enough work to open his shops. Aviation is the same as any other business, it requires a good bookkeeping and accounting system to assure success and we want successful operators on our airport.

In Aircraft Industries, Inc. and in its relation to Grand Central Air Terminal as a whole, we have a relatively balanced aeronautical community which we believe to be unique. Our devotion for getting the public out to the airport are calculated to do more than sell them poultry or seafood. We have attempted to carry the aeronautical appeal of the airport to its most advanced stage and we feel that we have met with much success in doing so, and we highly recommend our methods and positions to other airport operators for what they might be worth.

AVIATION  
November, 1933

AVIATION  
November, 1933

## Skin Deep

*As an authority on the mechanics of aircraft structures, Professor Newell's position in American aeronautics is unquestioned. In this series of two articles an affordable stresses in "Stressed Skin" aircraft structures he makes "new" by applying an irrational method to a rational problem.*

**By Joseph S. Newell**

*Associate Professor of Aeronautical Engineering,  
Massachusetts Institute of Technology*



After their transients that street in Los Angeles named for the Warner Bros. family is now a machine house where people buy guitars, hand-made maracas, and share parties of tobacco, with one cigar stand and more. A number of 1933 Me have spent the last hour and the administration building of Grand Central Terminal.

**S**INCE metal construction has come to the fore during the past four or five years, considerable research has been undertaken and appreciable progress made toward the ultimate understanding of the behavior of the stressed-skin type of airplane under various types of stress. Much remains to be done and many of the conclusions drawn from the data available today will definitely require substantial revision later. In the light of present day knowledge exact comparisons are difficult and unwise in it is the purpose of these articles to discuss an empirical method—one that might well be called an "Irrational Method," for the determination of allowable stresses in bending or compression as wing and fuselage structures of the stressed-skin variety.

#### Problem one

The problem of primary importance in the design of structures involving this sheet covering is the determination of the load, or intensity of stress, at which such covering will fail by buckling. The stress may be due to compression or shear, or a combination. The problems arising from the use of the skin as direct tension are generally simple and involve little beyond the provision of sufficient ribs, walls or clips to develop an ef-

fective continuity of structure. They will not be treated here.

The problems arising from the use of the skin as shear or compression involve the elastic instability of thin sheets of metal or wood which, for the best strength-to-weight ratios, are utilized at intervals so they cannot buckle in the immediate vicinity of the stiffeners. Between the stiffening members, however, the sheets tend to wrinkle or buckle long before they reach the maximum load which they are capable of carrying. These buckled portions offer little resistance to a load the stress in them is low. The portions near the stiffeners, on the other hand, work to relatively high stress intensities before reaching the maximum load where the combination of sheet and stiffener will fail. We have, in effect, a material with infinite coefficients, two widely different effective moduli of elasticity, one of which applies to the sheet near the stiffeners the other to the parts of sheet between stiffeners. Hence, if we are to consider a structure carrying a bending or shearing load for instance, we are faced to the conclusion that it will be impossible to apply the ordinary beam theory to an analysis in the use of the skin as direct tensionless one or the other of which is rendered useless by the variation in the rate of stress to strain. Either

cross-section which are planes before bending, remain straight after bending or, more the ratio between stress and strain is not constant, the intensity of stress in any fiber cannot be proportional to the distance between that fiber and the neutral axis.

If the designers are to use the stress-strain formula for beam analysis, it will be necessary to resort to some stratagem. One solution is to reduce the moment of inertia, i. e. something less than that of the entire material in the stress section, let us say by taking the moment of inertia of the stiffeners and a strip of skin acting in conjunction with them. The width of this strip of skin might be obtained by a rational method or by purely empirical methods. Another procedure would be to resort to the use of a fictitious allowable stress on the critical fibers. This would be analogous to our present modulus of rupture stress for wood spars. It would probably require the use of form factors or similar devices paralleling those used with wood spars at varying shapes and would, therefore, require extensive and expensive tests to provide the data necessary for the determination of the factors. As designers and tests on stressed-skin structures increase in number it may be possible to adopt one of these stratagems or it may be necessary to de-



If the staves are merely pressed into the ditch it will readily be seen that nothing at all for it will simply set in a coagulated to catch and hold water rather than carry it away.

The corresponding ditch should be the most effective construction of a trench drain. Cut the channel in a V shape. The ditch should be not more than 10 in. at the top, 18 to 20 in. deep. It should be cut in a straight line with particular care taken in shaping the sides. Carefully fit it to the area across the bottom so as to be lower in large as unobstructed channels as possible. Over these areas fill the ditch to the level of the soil surface with concrete graduated in size up to about 1 in. diameter slaked at 2 in. top. Concrete should be poured in sections in placing the larger stones, and if possible, they should be laid individually. Place them in such as much open space between them as possible without doing enough to avoid settling or bulging.

The greatest objection to the trench drain is that it must be carefully maintained. It must be watched for settling due to bulging of the stones, or from their breaking into the walls of the ditch. In selecting the stones, choose the hardest kind available. The rounded trap rock is probably the best because of its durability and the fact that its rounded corners allow for large open spaces between stones.

The trench drain must also be watched for erosion of the walls which would cause settling. This condition can only be remedied by filling with stones. In any case, drains must be spaced up, cleaned and refilled at least once a year. Unless the underdrain channel is kept open and space between the stones is kept free of dead vegetation and soil, the drain will not serve its purpose.

Although a trench drain may be located wherever necessary with safety, it should, like the open ditch, be cut as near as practicable along the line of natural drainage. It must, of course, remain essentially with an open ditch to carry off the water removal from the underdrain channel.

#### Tiles, concrete tubes

The same type of data may also be constructed by the use of tile or concrete tubes. As a matter of fact, tubes are to be preferred. They form a better channel, do not become clogged as easily, and do not require the attention of the trench drain.

In types of soil loose enough to allow ample filtration, a simple underdrain tile drain may be used. The common unglazed, straight, clay tile is to be preferred. Such drains should be placed deep enough to avoid breakage of the tile from surface loads. The discharge openings should always be provided in a manner that the drain is open and functioning properly.

Concrete tubes are coming into more common use. They have an advantage of greater strength than clay tile but are not so porous. Their disadvantage is expense, however, by leaving openings between tubes to admit the water. If concrete unglazed concrete tube is used (with a half shaped flange at one end), two or three inches of space should be left between adjacent tubes.

The cost of concrete tubes compares readily with one prohibitive. If they are purchased, strictly made up, there is always the additional cost of transporting them to the airport, with consequent loss in breakage from handling. Values should always be carefully considered for costs before placing. Cracks in concrete tubes are sometimes scarcely visible. Never put in a doubtful tube, for one failure may spoil the entire drain.

#### Home made tubes

Airport Engineer J. N. Viquez has designed an economical and efficient



means of making concrete drainage tiles at the airport where little equipment is available.

To make a 6-in. diameter tube, 24 in. long, cut two wooden circular disks 1 in. thick, 6 in. in diameter on one face and 5 1/2 in. in diameter on the other face. The disks are then given a slight taper to facilitate removal from the form. For 1-in. wall thickness, cut a third disk 5 in. in diameter. (If larger tubes are made, make the wall proportionately thicker by making the third disk larger in diameter.) Fit one of the 6 in. disks exactly in the center of the 5 1/2 in. disk, securing them with nails, with the smaller diameter face up. Into the upper edge of the upper 6 in. disk, and near the edge of the 5 1/2 in. disk, drive four straight rods spaced equal distances apart. These are to prevent the disk from falling down into the finished form. Now cut a piece 36 in. long from heavy sheet tin. Bend the tin into an approximate 6 in. tube over a piece of pipe (or some other suitable cylindrical surface). Fit one end of the tin into the finished 6 in. and 5 1/2 in. disk into the other end of the 6 in. disk and secure the tin with three pieces of safety wire as shown (see accompanying section).

Cut a section piece of tin, 25-32 in. in length, and shape it into an approximate 6-in. tube. Fit one end around the first tube over the 6-in. disk, securing it with safety wire. Fold the top edge of the two tubes apart with four wooden blocks approximately 1 in. thick, 3 1/2 in. wide and 2 in. long, evenly spaced around the circle. The blocks may be kept from falling into the form with straight nails. Secure the outer tube with about four strands of safety wire.

#### Pouring the concrete

Into this form pour a wet mixture of one part Portland cement and five parts sand. Care should be taken in pouring to avoid air pockets. Allow the form to stand for 24 hours. In stripping the form, the top disk must be removed first. Then the inner tube can be doubled in and removed carefully. The wires on the outer tube may then be removed and outer tube slipped gently off. Forms of this sort cost but a few cents to make. They may be used again and again. It may be found best to cast the inside of the forms with sand engine oil to prevent sticking.

Tubes should be carefully placed in storage and allowed to set for ten to fifteen days. For the first two or three days tubes should be placed in a barrel of water. If this is impossible, however, cover the tubes with canvas or burlap and keep them wet for the first two or three days.

Complete tubes will be of the straight-line type with four outlets in one end (left by the blocks used at the top of the form). In placing them in the drain they may be tested closely together.

## Engine Power Factor

*A picture story in air transport economics. The signing of a purchase order for one \$6,000 engine incurs the assumption of a contingent liability of \$25,000 to \$40,000 additional for operating it before the josh man buys it.*

By Herbert V. Thaden

THE equipment considered in this analysis is a contemporary two-engine transport with altitude compensated engine ensuring around \$500 ft. at various power factors (per unit generating power to maximum rated power).

Fig. 1 is based on the data given graphically in Fig. 2. Developed based on an hypothesis for determining the operating life of an engine. It appears from a part of values of engine life with respect to magnitude of power developed that this life could be conveniently expressed by a constant divided by some exponential function of the rate at which power was developed.

Assume 1,500 hours as the life of an engine operated continuously near its maximum rating (military version). The figure divided by the square of the power factor clearly approximates the observed lives of similar engines operated continuously at reduced power factors (commercial versions). Thus

$$\text{Life in hours} = 1,500 \div (\text{P.F.})^2$$

Owing to the scarcity of recorded data available it is expected that the constant and exponential factor will be subject to modification as further data are obtained. Assuming, however, the tenability of the hypothesis, the determination should offer an effective method of specifying life of an engine, as well as frequency of overhaul periods. The latter could be used liberally specified as increments (say 1/10 or 1/5) of the cumulative life of the engine. Thus for a five overhaul engine, the

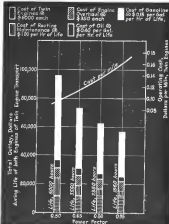
$$\text{Hours between overhauls} = 1,500 \div (\text{P.F.})^2$$

The hours of operation and the average power factor could be recorded in the log of the engine. When the cumulative sum of the product of operating hours and the square of the respective shaft power factors reached 150, the engine would be due for overhaul. At the end of the overhaul, the clock overhauled period the engine would be due for re-overhaul.

It is believed that some such method of determining life and frequency of

overhaul as well as depreciation rates and purchase quantities would be quite satisfactory for all concerned (including the Department of Commerce inspectors). This current method of assessing an arbitrary quantity for life and rate of operation. Compliance with this spending practice could be

equally developed for those operators who desired to run their engines at differing power factors. Thus an operator who wished to disregard the relatively higher cost, could be permitted to operate at a high power factor, but would be required to overhaul and retire his engines in a shorter period than an



operator who operated at a slower and more economical speed.

Study of the absolute values of the total savings in dollars during the life of the engines, and of operating cost per mile for varying power factors, indicates several cogent facts:

(1) To make a yard stick in the operating cost the largest item should be attached first, namely fuel cost. A 10 per cent reduction in this item alone would be equivalent to a 45 per cent decrease in the initial price of the engine. The solution is obvious, select specific fuel consumption and/or the price of fuel used. The engine manufacturer is naturally in the best position to distribute how to do this, but the operator certainly can expedite matters by increasing development of engine improvements, accurate engine control, automatic temperature control for intake air, oil, and cylinder heads, constant speed automatic control, and a positive and accurate indication of fuel consumption, use for the guidance of the pilot. The advantage of engine maintenance, selective engine repairs for automatic lubrication of push rods, larger spark plug overhaul periods, better cooling, etc., as well as greater adjustability of all parts requiring servicing operations.

(2) The transport operator should make certain that every opportunity is taken to operate at a reduced power factor. Pilots should fly on schedule and not against it. Every flying condition should be selected to reduce power factor. It should be remembered that with flying winds, even though the pilot never greater pay by flying in the air, the scheduler, and, the net result to the operating cost is a saving due to lowered fuel consumption, greater engine life and longer overhaul periods.

It is understood, of course, that power factor should be distributed judiciously over the entire schedule by intelligent variegating; and that schedules have been set up on the basis of a high frequency of "no time" arrivals (assuming a sufficiently high average normal load was) and a conservatively estimated average flight schedule at the existing power-factor operation desired. In the event higher than normal load would be encountered, the operator must decide what excess above the normally desired cruising power-factor is warranted to make schedule.

(3) It will be noted that the cost of operating 1 mile is approximately 70 per cent greater at 50 power factor than at 50 power-factor. The corresponding speed increase is only 20 per cent. It would appear that high speed obtained through high power-factor is an expensive expedient.

## Editorials

### AVIATION

EDWARD B. WARREN  
Editor

#### The Glad Hand

ON SEPT. 26, with a smile of the Presidential pen, Washington extended the right hand of fellowship to the air transport industry of America. With every a reassuring assurance—"Whereas safety and rapid commercial air transportation has made notable progress . . . Whereas a federal airway system is a vital factor . . . the week of Oct. 14 was proclaimed as Air Navigation Week and the country at large was urged to study past accomplishments, to encourage future progress."

All of which is just barely. We are all for it. We have been trying to get some such idea across for a long time and it encourages us not to learn that the present administration is so wholeheartedly with us.

Before allowing ourselves to be lulled into a state of complacency by this gracious right-handed gesture, however, it is well to bear in mind that the administration also poked a wicked left—and that it has been noticeably careless about leaving its left hand where that right hand doth. Men who have been straggled as crooks and thieves from their chosen professions without having their due in court; airlines that struggled along with ridiculously low fuel compensation and lost money hand over fist during 1935 and 1936; and lines that are still trying to collect the million dollars owed them for services rendered early in 1934, are inclined to look with some suspicion at empty congratulatory gestures. An industry whose hopes were raised by the leaders of the Federal Aviation Commission, only to see its spirit damped into Washington warm-bathes, is not anxious to be fooled again.

If Washington really believes that a Federal Airways System reaching into all corners of the United States is a vital factor in the social and economic progress of the country, now is the time to do something constructive about it. And the first and most essential move is to take aviation out of politics, to cut out political shadow-boxing.

The sooner the people in Washington realize that

air transport has already taken its place as a vital factor in the social and economic life of the country the better. There is no longer any question of fostering a weak and uneconomic industry for reasons of national expediency. Although in years air transportation may still be an unadmitted industry, it is growing up fast, and has demonstrated a surprising ability to thrive under conditions that would long since have killed a weaker. If there is any doubt on this point, a glance on the charts on page 46 of this issue should settle the matter. In no period of history have conditions been so discouraging, yet progress so rapid.

But things would move at a greatly accelerated pace if the recent Roosevelt proclamation could only be taken literally. Technically, air transport is ready to go ahead at a rate that would stagger its most optimistic backers if the keys on the banks of the Potomac will only give it a chance.

#### Fan at Airports

IN A CERTAIN SECTION of these United States there are two airports. One is losing money for its generosity at the rate of 9 cents per clock tick. The other pays the interest on a large bond issue and makes a profit. The first is a monument to the lack of vision of the city fathers. The second is a gathering place for the city masses. And in spite of such overwhelming evidence, there are still some thinking airport managers who turn up their noses at the suggestion of even making their airports pleasant places for the non-flying public to visit.

There will never be profitable aviation unless that money required from visitors' pockets by postcard vendors, golf course, swimming pool, or doughnut machine operators will not be spent for aviation. And they are right. The airport guests who are limited in affluence to purchases of popcorn, can't help aviation much directly. But is there any reason why a portion of their dimes and nickels should not be contributed to the operation of the airport? It takes a lot of penny profits to run an airport but most airports are big enough to hold a lot of

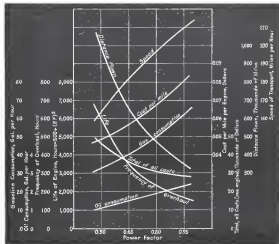


Fig. 1

people, if you only go to the trouble of getting there out there.

Another type of operator hesitates to go in for post-prohibition recreational facilities because of pressure that the local W.C.T.U. might bring to bear to his constituents. He himself is properly aware of the due consequences of aiming alcohol and airplanes. But he can't lose sight of the fact that there may be 25 or 30 drinking places within a 15-cent taxi ride from his field. Maybe there are one or two across the street. Perhaps it might be better for him to put a respectable red-tail lounge in his administrative building, and exercise some control over the disposal of indulgence of his patrons, using the profits to help maintain the airport.

There may be other arguments against recreational facilities at airports. Most of them will melt before the cold blooded necessity of making a flying field pay its own way during a period when taxpayers cannot bear unnecessary contributions to non-productive projects. All but the heaviest of fields can easily become white elephants if the meddling public is not properly impressed with their value to the community. And in every hundred yards there is always a chance that there are some prospects for flight training, charter service, or private ownership among them.

If you do not want your airport to run the future risk of being planned to cotton, wheat, or hay, turn to page 36 and read the experiences of an operator who knows how to make a field pay its way without benefit of assistance from his city or his government largely on its merits as a recreational center.

### There Ought to Be a Law!

THAT IMMORTAL lawgiver who drafted an act setting a maximum speed limit of twenty miles an hour for airplanes flying within 50 ft. of the ground and providing that pilots colliding with telephone poles should be imprisoned, has gone to a well-earned retirement, but he has left plenty of room for someone bent on making the life of the aviator unhappy in a slightly less spectacular fashion.

When state legislatures have undertaken to hook up federal action and enforce uniformity, their work has been advisable. When they undertake to promote aviation and to create new landing fields and airports, they are often helpful in the extreme. But when they begin to superimpose haphazard requirements of their own on those of Washington and to use their own demands as a basis for levying new taxes on aircraft and pilots, building up new governmental organizations on a grand scale or imposing regulations in enormous detail beyond the requirements of safety, they become a nuisance and a handicap to development.

The past session saw another bill in the New York legislature to enlarge the work of the State

Aviation Commission. It had many admirable features, but when we discovered that "Each airport located within the state shall be provided, among other things, with a soil surface, wholesome drinking water, an adequate supply of ordinary food and beverages (and so on)," we were aghast. Similar measures appear elsewhere from time to time, and some of them get by. In New Hampshire the law recently demanded on two amateur pilots, flying their own planes purely for pleasure, because they made arrangements with a property-owner to land in his field without first getting it licensed as an airport. Pneumatic landing could no further go. Be warned by the example, and keep an eye to windward on your own state capital, lest you find some well-meaning provision of law slipping through to bring new afflictions about the neck of aviation's activities.

### No Violets

"It isn't raining now today,  
It's raining violets!"

NO VIOLETS to rain down from the sky come a fine day, but armed men in squads, in platoons and in whole companies, if the new tactics disclosed in recent maneuvers by the Soviet armies ultimately prove to be practical. And graduated they seem to be, for, according to report, some 500 shock troops were dropped out of the sky by parachute to stage a successful surprise attack on an airborne unit behind the "front." The dropping of spies or other individuals behind lines is an old story, but to let down fighting units en masse, deep in enemy territory is a new tactical concept. Five hundred determined men dropped in the rear of a critical sector might easily wreck a strongly fortified position and open up an otherwise impenetrable front.

Thus, not far from spot have the keys and girls of Russian helicopter in rear of thousands from the tops of steel towers—in thousands from airplanes in flight. Then Soviet interest in giant airplanes of the Mexican G-1 type and in mass parachute jumping in airships has been detected less by the Soviet tendency to make a virtue out of the merely colossal than by a definite and well developed plan toward a new military tactic. What it is really worth, whether or not it may be and successfully it might, whether the size of the machines that must be used will make surprise difficult, or whether they will be too valuable to air attack, are matters that must be settled under conditions of actual combat. Here, however, is another factor which may, along with high speed tanks, motorized cavalry and bubble nose artillery, go a long way toward breaking the stagnation of trench warfare. Here is a new idea for our generals and our War College experts to think about.

# Flying Equipment

## Transport in Miniature

The Curtiss-Wright Coupe, with flying characteristics for the amateur pilot, but built like a modern airliner.

Mentioned before in a Department of Commerce sponsored project (AVIATION, September, 1935), but heretofore withheld from public view, is Curtiss-Wright's answer to the Vial specification for a small airplane suitable for private pilot use. Early study of the specifications convinced Ralph Dimes and his associates that low operating and low maintenance costs were just as essential as low landing speed and rate of climb. They turned away the brains located in the construction of all-metal transports during the last few years and worked out what might well be called an earlier in miniature but one which would conform to Bureau of Air Commerce specifications for a private owner type. How well they succeeded in putting together three apparently contradictory aims may well be judged from the dimensions and the performance figures which follow:

11' span range, good handling characteristics, and economy are to be taken as the criteria for private owner ships, the Coupe sets high standards. Its top speed is 121 m.p.h., an excellent figure for a 90-hp. engine. Stalling speed, thanks to a fixed slot and a flap over 70 per cent of the span, is 44 m.p.h. Speed range, then, is practically three to one. The slot and flap combination coupled with repeated curved airfoil control give adequate maneuverability at low speeds, and the high stall-lifting capabilities of the landing gear make the ship easy to get down. On the economy side, the fuel consumption is reported as 54 gal. per hour, and the single all-metal structure and the simplicity of



All metal, from left to right: Curtiss-Wright's interpretation of the ideal airplane for the private owner. Built at the Robertson plant, Chicago. A. Frank, in chief engineer, supervised. © W. Smith (the major) copyright.

power plant and other auxiliaries make for exceptionally good maintenance economy.

The fuselage is an all-metal monocoque type of relatively heavy gage 24 ST Alclad, of steel, light stronger and stronger smooth skin. The wing is also all metal (24 ST Alclad) in trailing edge and framing, built up around five spars. It is made up in two panels, bolted together and also bolted directly to the fuselage. All metal ailerons are attached to one of the spars by a full length piano-type hinge. Their movement is so only. They are locked against down travel just the original position by a cotter pin of an after lock with the control rod whereby the pulleys are made to rotate idly when the aileron reaches a neutral position. At all times, however, they are rigidly and directly connected

with the opposite aileron control mechanism.

A flap of the split type covers 76 per cent of the wing span. It is operated by a rotating handle similar to those used on automobile window lifts which is located under the pilot's seat. Connections from handle to flap is made through tongue tubes in such a fashion that the load on the handle remains almost constant regardless of air load on the flap. Yet is transfer is constructed to fit wing. Stabilizer and its one of the fixed type with trailing tube on the elevator. This is operated by a flexible reversible mechanism. Elevator and stabilizer are also of all metal construction. Flaps are of the piano type extending from tip to root section.

The landing gear is of a partially retracting type. Both air-wheels are mounted on V's in slots which are non-

usually held up in the take-off position by a small latch in the slot leg. The latch is automatically released so that the slots moved to their full out position as the first turn of the handle controlling the wing flaps. Hydraulic brakes are fitted both for parking and for pedal operation. The parking brake operates from a simple sliding control on the instrument board.

Power plant is a 90-hp. Model B 266 Lambert radial engine. It is supported on a modular steel structure on rubber insulating bushings. The cowling is so designed that no part struts directly to the engine. It is supported by struts from the engine mount proper, thus allowing the engine to move freely inside the shell. A piano type hinge along the top makes it possible to open it up completely. Of the enter panel may be removed from the engine by pulling out three small pins which hold down the hinges.

The 50-gal. fuel supply is carried in two tanks located on each side of the fuselage in the wing. A 6-gal. reserve tank is built into the left-hand main tank. The air tank with 1-gal. capacity is attached to the forward directly behind the engine.

In the tail, two seats are arranged side-by-side and dual controls are fitted, one of which may be easily disconnected if desired. The main rear low position of the engine forward, coupled with large windshields, wide windows and a generous transparent panel in the roof.



Fuselage is a true monocoque, with staggered former rings and no heavy ribs and all structure. A view looking back from the cockpit.



Fuselage shows in smooth heavy gage 24 ST Alclad. Arrangement of windows and doors, also structural of wing to fuselage are visible in this construction monocoque.



Tail section, like the white, are metal finish, angled around.



The landing gear is of a partially retracting type. Both air-wheels are mounted on V's in slots which are non-



Wing flaps extend forward trailing edge 76 per cent of chord between ailerons. Also, two flap landing speed is 41 mph.



For easy engine maintenance, the engine cowling can be swung flat and accessible back.

affords excellent vision for both occupants. Above the windshield are included two amovable type windshields which afford vision to the rear for landing or before take-off. Two large doors, one on either side, give access to the two seats. Seats are fitted with spring cushions and are upholstered to suit individual customer's requirements. They are adjustable.

The control column is of a conventional type similar to those used in modern transient airplanes except that it is installed in an inverted position, allowing the wheel to move directly down and air with no obstruction in the cockpit. The wheel shaft is held in place by a bearing at the instrument board.

The general specifications of the Curtiss-Wright Coupe are as follows: wing span, 35 ft.; length overall, 25 ft. 6½ in.; height, 7 ft. 3 in.; wing area,

174 sq ft.; stabilizer area, 16 sq ft.; distance span, 30 sq ft.; radiator area, 4.5 sq ft.; total empty weight, 1,154 lb.; weight empty, 1,254 lb.; useful load, 646 lb.; gross weight, 1,800 lb.; wing loading, 40.1 lb./sq ft.; power loading, 14.9 lb./hp.

The performance figures are: maximum speed, 131 m.p.h.; cruising speed, 115 m.p.h.; rate of climb, 500 ft. per min.; stalling speed, 44 m.p.h.; ceiling, 17,000 ft.; cruising range (normal) 400 miles; cruising range (maximum) 1,150 miles.

## Douglas Bomber

Competitor for Martin and Boeing in bomber contest

Have been the Douglas competitor for Air Corps orders under a specification for which bids were opened on Aug. 22

last. As with both the Boeing and Martin bids (Aviation, September, October) military expediency has placed a curtain of secrecy about the intricate details of the Douglas. In general it may be described as an all-metal, mid-wing monoplane with a very deep oval fuselage. The landing gear appears to be of the nose general type as that used on the DC-3 transport. It is a safe guess that close examination of the structure would yield many points of similarity to standard Douglas transport practice. Its exact dimensions, the type and output of its two engines, its load-carrying capacity and its performance are, however, matters that went against the pleasure of the War Department and the Douglas Company. So far, no reports have been received to indicate the outcome of the Wright Field tests, but some statement should be forthcoming shortly.



The Douglas Bomber is a successor of Boeing in participation in competition for new Air Corps equipment.

## Navy Record Breaker

### First glipse of the Consolidated XP3Y-1

SHIPBOARD in that sense (News Section) is recorded the Navy's latest long distance flight made by Lieutenant Commander McMillan. Herewith a picture of the airplane which set the record. As it is read with the latest military equipment, details and specifications are lacking, but a number of interesting features are visible. Although this machine is a direct descendant of the XP2Y-1 series (Aviation, March, 1933) it varies in a number of important details. A semi-streamline wing with hinging only to the upper section replaces the former combination of ordered struts and bracing wires. The wing tip float mounting does look a bit complicated, but in flight the float swings upward and inward and becomes the wing fin. All the apparatus now visible disappears completely into the wing, leaving the surface flush and smooth. Power plants have been lifted

into the wing and moved relatively close together. Consolidable push propellers are fitted. The length of the engine cowling suggests that the engine may be of the twin row type. The cowling

swing trailing edge flaps for controlling the rolling.

The lines of the hull appear aerodynamically good. Everything is mounted up to a high degree. Rudder and elevators apparently carry trailing tabs. The high mounting of the stabilizer on the fuselage should add to the maneuverability of the boat.

## Kruesi Compass

### Fairchild installs radio compass in privately-owned Electra

MR. R. W. NANCE of Shoreport, La., is lately interested in the Rhodessa outfit of that state and was a specially fitted up Lockheed Electra for business and pleasure transportation in that area. To assist in navigating over long runs, he has recently had a Fairchild Kruesi radio compass installed in his ship, one of the first commercial applications of this equipment.

The illustration shows the compass indicator mounted on the Electra's instrument board with the rotator mounted on the engine roof and the loop above it. The remote control having panel may be seen just behind the rotator. The radio requires most proper to be located in a convenient out of the way place at the forward part of the cabin.

Incidentally the airplane in which the compass installation has been made is said to be one of the most fully equipped private airplanes yet built. The passenger cabin is finished entirely in green leather, is equipped with four adjustable seats, a window, end-table, card-table, lavatory, electric stove, electric refrigerator, buffet, electric bar, hot two-way communication facilities. It is also one of the first all metal airplanes to be finished in other than the natural aluminum. The exterior of this ship is painted an opalescent green. Its owners are planning a long distance flight to South America and through Europe.



The Consolidated XP3Y-1

See page 107

Curry Sanders will pilot the plane. Another commercial installation of the same equipment is in the Douglas DC-1 now being operated on high altitude research by TWA, at Kansas City. This is the same installation that was used by the Bureau of Air Commerce for test flight over the Pacific early last spring to demonstrate the use of the radio compass over long distances and especially over water.

## Valtee Attack

### A military model by the Airplane Development Corp.

ARMOROUS in details have been released, a picture has come to hand of a military version of the Valtee biplane apparently designed for combat attack and light bombing work. Many of the structural details appear to be similar to those used in the transport. The landing gear seems to be of the same type, with single lock-up two-type gear struts hinging toward the fuselage. Standard Valtee construction practice has been followed in the fuselage with the usual transverse rings of flat sheet forming the stressed skin and with a maximum of exterior structure. Most notable departure from conventional arrangement is in location of the horizontal tail surfaces. The stabilizer has been moved up back with the top surface of the fuselage, and also shifted well ahead of the fin. Sectors of the "Foreign Builders" department will recognize that this is an arrangement which is becoming increasingly popular abroad, particularly in Germany.

An interesting feature for the tail wheel is in evidence. The tripod arrangement under the cockpit never permitted at the pilot's seat is apparently designed to protect the occupant in case of a nose-over on the ground.

## C-34 Cessna

### A four-place cabin monoplane with a Warner Super-Scout

LETTER of the Cessna to come out of the Wichita factory is the Model C-34, a four place cabin land monoplane, powered with the 145 hp Warner Super-Scout. Like most of its predecessors, the machine is a full cantilever type with single, clean-cut lines. Most obvious external improvement is a closed up landing gear with retractors, streamlining struts on each wheel. General streamline lines dominate the picture. A conventional oil-cooling shock absorber has a 6-in. vertical travel. Tail wheel is full swiveling and also carries an oil-cooling shock absorber.

Fuselage construction is conventional, with side wall below cover. The wings are built around braced spar spars extending from tip to tip. The leading edge are plywood covered, the remainder a fabric covered.

Cabin is accessible through a wide door on each side. The seats are well upholstered, spaced to allow ample leg-room. The broad windows give good vision to the sides and downward. Large baggage compartment is provided. The equipment includes dual controls, brakes, combination parking brake and rudder lock, wing flaps, long-tailed trimming tabs, Kollsman instruments, electric starter, battery and magnetron lights.

The Warner Scout engine is a full power unit, is enclosed in an NACA cowling. Tankage is provided for 32 gal. of oil.



Close up of the nose of the new Cessna C-34 shows extreme streamlining of all details.



MEETING Valtee. An electrical landing attack ship recently built by at Shoreport.



A Fairchild Kruesi radio compass mounted in the cockpit of a privately-owned Lockheed Electra

General specifications include span, 25 ft. 10 in.; wing area, 180.5 sq. ft.; weight empty, 1,350 lb.; payload, 666 to 822 lb. (including pilot); gross weight, 2,220 lb. Performance (with wooden propeller): high speed, sea level, 302 m.p.h.; cruising speed, sea level, 143 m.p.h.; landing speed (flaps down) 47 m.p.h.; climb (first minute), 1,000 ft.; cruising radius, 584 miles; gasoline consumption (cruising speed) 9 g.p.h.; service ceiling, 30,500 ft.

## Whirlwind Electras

### EAL takes delivery on Wright-powered Lockheed transports

Four Model 30-D Lockheed Electras (A.T.C. No. 125) have been delivered to Eastern Air Lines for service on East Coast routes. The 10-D is very similar to its predecessors except that it is powered with two Model 905-E3 Wright Whirlwind engines, rated at 440 hp. each at 2,200 r.p.m. at sea level. These engines are fitted with the new Wright dynamic inducer (see Aviation, August, 1935). Propellers are the Hamilton Standard adjustable pitch type set at the factory for best cruising speed for the conditions under which the planes are to be operated.

With the new engines, this 10-D has been licensed for a gross load of 10,000 lb. instead of the former figure of 5,700 lb. As delivered, they are fitted for two passengers, two pilots and 200 lb. of cargo. Top speed is approximately 250 m.p.h.

Complete Western Electric radio equipment has been fitted, including a Model 13A transmitter and Model 14A and 17A receivers. Two fixed antennas located under the fuselage are used for receiving, while a new Heintz & Kahlmann automatic rotator in the tail cone (see Aviation, October, 1935) controls a sliding wire antenna for transmitting.

Cabin interiors are finished in blue. Deicing equipment and air conditioning are provided on the same pattern as in the machines previously delivered to Pan



Comfort and convenience for the flying traveler, the interior of Whirlwind III.

American, Bonht and Northwest Air Lines.

## Executive Transport

### Boeing turns out a flying club car for Phillips Petroleum

Lester Wacker of aeronautical progress in Phillips Petroleum Co. at Bartlesville, Okla. Ships bearing the cryptic name "Whisper" have figured in many an aeronautical contest, and, likewise, perhaps, being Whirlwind II which, flown by Art Gabel, won the Dole race to Hawaii in 1927.

Third ship to bear the name is a Boeing 26-D transport just completed

at the Seattle factory for executive transport service for Phillips Petroleum. Specially, the ship is the same in all particulars as the 26-Ds in service on United Air Lines. It is equipped with two 550 hp. geared Wasp engines, has a top speed of 252 m.p.h., cruises at 160 m.p.h. Special gasoline tanks have been installed, however, to give it a non-stop cruising range at approximately 1,000 miles.

The interior of the ship has been so fully refitted as to comply in the special requirements of the purchaser. Eighteen metal over-stuffed easy chairs, a dining table, refrigerator, built-in radio, bath for receiving passengers and program and for two-way communication with the ground.



Wright Whirlwind-powered Lockheed Electras, of which four have recently been delivered to Eastern Air Lines.

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## With Foreign Builders

**Notes on King's Cup Winners, a transport or two, a collection of sporting types and two for the French services**

IN DECADES sport-flying circles last month the race for the King's Cup held the center of the stage. As reported in last month's news Miles designs (now authorized by Phillips and Powe of Reading), made a close race, taking first, second and third places. The Miles Falcon won which Flight Lieutenant Bone was the cup, was the standard single-engine, low-wing, cabin monoplane type, normally two-place, but for the main field in a single-seater, was the standard in the corner of the ship. It was originally test-flown with a 150 hp Gipsy Major but for the race a Gipsy VI rated at 200 hp was installed and a great improvement in performance was obtained. Calculations indicated its speed to be 245 m.p.h. but in actual time it flew at about 230 m.p.h. The two Miles Hawks were with which were flown to second and third place were also fitted with Gipsy Major engines. Ships of this type (two-seater open cockpit) will be used for training pilots at the Royal Air Force at the Reading School.

The Miles Gull which set a new speed



The Miles Falcon in which Flight Lieut. T. Bone won the King's Cup.

record for the King's Cup series, is a single seater, also fitted with the 200 hp Gipsy VI engine. It has possibilities for high speed experimental course work. Fuselage is all plywood box construction and all fitting is of spruce. Controls are completely covered but there is an excellent view all around. It is leaned well toward the tail, rear section of our own Gee Bee. Controls are said to be light and positive. Wings are fixed with hydraulic brakes. It has a span of 24 ft., length overall of 29 ft. 3 in., empty weight 1,080 lb., full, 1,275 lb. Its top speed is 320 m.p.h. in cruise at 145 ft. It will climb 1,400 ft.

per minute at sea level, and will reach a ceiling of 24,000 ft.

### Sporting types

A modification of the Miles Hawk designed as a small two-seater but adapted for blind flying instruction, is the Nighthawk. It follows the usual Miles formula for a two-place, side-by-side wing cabin monoplane. It is powered with a 140 hp Gipsy Major, although it is also intended for the 200 hp Gipsy VI. Fuselage is of the Miles modern box type. Wings are of the two-spar variety with plywood covering. A hydraulically operated spiral tailing edge flap is standard equipment. Tail surfaces are of the usual monoplane design with elevators increased by tabs. This ship has a reported top speed (at 1,000 ft.) of 190 m.p.h., cruise (also at 1,000 ft.) at 130-135 m.p.h. Landing speed (flaps down), 40-45 m.p.h. A variety of types of dual control can be installed, and one-half of the cabin may be closed off with curtains to simulate blind flying conditions. A duplicate set of navigating instruments is installed.

## AVIATION November, 1935

A new machine which has been seen at Hroven lately is the Phoenix (Gipsy VI engine) designed and built by Hroven Aircraft, Ltd. It is a two-place cabin monoplane type. The high wing is strut braced to a pair of short ribs protruding from the fuselage at the tail. The whole side should be leaving for the rotating landing gear. As for performance figures are available here, but they should be interesting, for the machine appears unusually clean when in the air.

From Hroven comes a picture of a motor omnibus machine (described previously) which is a little difficult to classify as to civil or military type. For whatever purpose, it is a low-wing, twin-engine, monoplane with tandem seats for three people. The layout and working of the engines are interesting. The arrangement of windows in the underside of the nose sheet of the fuselage suggests possible use as a light bomber.

### Transports, land and air

One of the most recent and more interesting small transports reported from abroad is the Koellhoven's F.N.30 which is a high wing, cantilever monoplane for two pilots, and eight to ten passengers. Power plants are two Pratt & Whitney Wasp JCs, each having a maximum output of 465 hp at 2,200 r.p.m., set in the trailing edge of the wing. Hamilton Standard controllable pitch propellers are fitted. The engines are mounted in unobstructible mounts of welded steel tubing. Exhausts are of stainless steel. Equipment includes full R.A.C.A. cooking and heating system. Each engine has its own fuel tank located between the wing spars. Cabin seats are normally slung by engine driven pumps, but emergency hand pumps are also installed. Fuselage is of welded steel tubes, rivets covered. The cabin may be arranged for eight passengers for long-range work or for the passengers for short flights. Three baggage compartments are available—two forward and one aft. Complete cabin heating and ventilating equipment is installed.



The Phoenix. New Gull which set a new speed record at 320 m.p.h. for 200 miles.

## AVIATION November, 1935

The cantilever wing is constructed entirely of wood. It is built up around two box-type spars of spruce. The wing, plywood, covering is plywood. Ailerons are dual. They are symmetrically hinged. Landing struts are mounted between the ailerons and the fuselage.

Tail control surfaces are of steel and dual, fabric-covered. The stabilizer and the fin are made of wood. Rudder is also fabric-covered and has trimming flaps controllable from the cockpit. Landing gear is fixed with Koellhoven shock absorbers. Wheels carry low-pressure tires and independently operated brakes.

The machine has a span of 39 ft.,



Koellhoven F.N.30 in air.

length of 46 ft. Weight empty is 5,687 lb., gross, 9,000 lb. Top speed is 170 m.p.h., cruise 152 m.p.h. Landing speed (flaps down), 62 m.p.h. Absolute ceiling is 30,700 ft.

On the commercial side, both France and Italy have new flying boats. The French boat is a low-engine, low-wing, cantilever monoplane with ailerons with dual control surfaces. The cockpit is forward. Span is 25 ft. 3 in., weight empty is 9,200 lb., gross weight 14,400 lb. Top speed at 1,000 ft. is 170 m.p.h.

with retracting undercarriage. The wheels roll up into recesses in the wings. Two engines, Pagny-Stallan (H.C.C.) of 700 hp, each are mounted side-by-side above the wing. The wings are of the two-spar type covered with plywood. The hull contains a motor passenger cabin accommodating twelve people with pilot and observer's cockpit forward. Span is 25 ft. 3 in., weight empty is 9,200 lb., gross weight 14,400 lb. Top speed at 1,000 ft. is 170 m.p.h.

### Military types

Although the most recent of French language bombers have been discussed, the most interesting one of the latest make to appear is the Loeb or Olivier 800 right border, a large biplane. The ship might more properly be called an experimental machine for the upper wing has just behind the chord of the lower. It presents nothing of the wing suggests the Conquest-Hall entry for the Conquest-Hall entry in 1929. The control fuselage is very deep and has the underlying fuselage's conventional character of the Loeb machines. It is powered by a Gnome-Rhone radial air-cooled engines with a total 1,560 hp. The engines are mounted in nacelles in the lower wing panels. Twin vertical air-cooling ducts extend into each nacelle. Fuselage and wing are dual framed, largely fabric covered.

Pilot's cabin is just ahead of the landing gear of the upper wing. Two seats are provided, side-by-side, with dual



The Koellhoven (Koellhoven) F.N.30. Occupied. Power plants are Pratt & Whitney Wasp JCs. Koellhoven's design and production are fixed.

control. A radio man is accommodated in a cabin behind the wing, and the rear fuselage contains of a machine gun station above and one below the fuselage.

Airplane has a span of 81 ft. 5 in., length of 96 ft. Empty, it is 13,000 lb., full, 16,200 lb. Complete armament weighs 2,562 lb., and fuel for use 1,260 cubic inches weighs 4,400 lb. The speed at 15,000 ft. is approximately 200 m.p.h.

Another recent French military type is the Loeb-211 single-seat, monoplane designed for reconnaissance. It is a low-wing monoplane with a cantilever fuselage mounted on a single control fin, outer stabilized by two tip fins. Armament consists of two machine guns, mounted on the wings along outside the propeller disk. With a single radial air-cooled Hispano-Suiza engine of 750 hp, its speed at sea level is said to be in the neighborhood of 170 m.p.h. Fitted with a Gnome-Rhone engine of 1,000 hp, however, it has shown a top speed of about 245 m.p.h. at 15,000 ft. Construction is all metal. A controllable pitch propeller is fixed.

## Abstracts

### Windshields and Weather

Two papers, one British, one American, on cockpit enclosures

With all due respect to the progress which has been made in the art of blind flying, no pilot should be required to fly blind because he cannot see through his own windshield. Unfortunately, in flying over most airplanes through heavy rain, dust or snow, his only alternative is to open the front glass or at least to cut through a side window, carrying as so best he can with the weather ball in his face. Since an unobstructed, overhead or thermal device has not been discovered to keep windshields reasonably transparent under bad conditions, a study of various patterns in the vicinity of windshields with a view toward deflecting the air blast in such a way as to prevent windows to be partially or fully opened and, at the same time, to solve any doubt as to this issue is the most logical step.

A RECENT British paper on windshields (R & I No 1412) has been concerned chiefly with the problem of the military machine with open cockpit. Wind tunnel and flight tests have been made on two types of windshields, the first provided with deflector vanes arranged in such a manner as to reduce the air pressure area behind the windshield to prevent the pilot to look around him side window being struck as the face by the air blast. In the second, the glass is divided into two parts horizontally and equipped with a mechanism to allow a forward rotation of the upper half accompanied by a rotation in the opposite direction of the lower half. Thereafter, the pilot can obtain a clear view through the horizontal slot, while rain drops, dust and snow particles will be deflected upward over his head.

Preliminary tests on the deflector type of shield indicated that a pair of slats or vanes, mounted as shown in the sketch (A) parallel to one edge of the forward panel increased the width of the shielded area by 4 or 5 ft. in, enough to permit the pilot to look around the corner without discomfort at all speeds (as evidenced by subsequent flight tests) up to 240 miles an hour. Whether the slats were of artificial reason, flat plate or strips bent to a circular arc of 1/4 radian seemed to make little difference except for simplicity of setup for test results. It was suggested that the deflector vanes might be made out of glass, but being only 2 in. wide they offer con-

paratively little resistance to rubbing. The deflector type of windshield (B) gave good results also, both in the wind tunnel and on flight tests. Flying in all kinds of bad weather conditions it was found possible to open up a slot between 14 and 12 in. wide without undue discomfort to the pilot. The amount of opening gave sufficient forward view for all flight conditions.

NACA Report No. 496 on windshield improvement deals entirely with closed cockpits for ships of the Douglas and Boeing class. The work was carried forward on a full-scale mock-up in the 7x10 ft. wind tunnel at Langley Field.



Windshield windshields: (A) Side view of British arrangement of deflector vanes along edge of shield for open cockpit design. (B) British type windshield also applied to British open cockpit machine. (C) NACA modification of British shield and deflector windshield. (D) Side view of revised deflector design by NACA to permit pilot advance forward view through side window.

Six different types of shield were investigated, including square and rounded front, forward and rear slats, and straight wind Van. Two methods of approach were used, both defining somewhat from the British. The first method of opening (at pilot's eye-level) a horizontal slot in the forward panel behind a deflector shield (C). Where the British slotted windshield (B) permits windows to come through to be deflected over the pilot's head, the NACA type tends to prevent the down reaching the slot by throwing them upward over the cockpit roof. The second involves a redesigning of the basic shape of the shield enclosure. Traces that the addition of auxiliary deflector to correct an inherently bad situation to provide a shielded area of side windows through which the pilot may look by inclining his head sideward without venturing the full benefit of the air blast (D). Both methods have yielded promising results. It was found that it was possible to make openings up to 2 in. width across a flat front panel in vertical or sloping windshields to permit a reasonably good view directly forward without having windshields slant. That requires, however, the presence of a small auxiliary shield mounted some 18 in. ahead of the windshield across the nose of the ship, an arrangement which in itself constitutes an obstruction of the forward view and also introduces some structural complications. It was suggested that the shield might be made retractable, to be withdrawn into the nose of the ship when not in use, but this would involve extra weight and complication.

A simpler arrangement, especially for new designs, lies in the modified straight rod. First of all, windshield with an open window on each side. When open, he made to afford a field of view from the cabin over a large part of the forward hemisphere without any appreciable amount of rain or wind coming in. The general arrangement is shown in the sketch (D). The arrow at "N" shows how a simple gutter prevents the inward drops from entering the cabin. As with the case of the slatted shield, a slight increase in the static pressure in the cabin is necessary to prevent air currents flowing in the side openings. Although the coverage of these two types is the same, however, the indications are that the design of a windshield (low radius shield or open cockpit) that will permit considerable unobstructed view and, at the same time, protect the pilot from wind and rain, is entirely practical.



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## Operator's Corner

*An exchange of ideas on the problems of  
the commercial aviation industry*

**QUESTION 15:** How do you compute aggregate costs of the various forms of alcoholism? Is it like other symptoms? What considerations do you use? On what basis do you compute deprivation of employment? Interviewed by Edward A. Myers, Management Science Center, Los Angeles, Cal.

In Holland

## Jim McIlroy

**O**UR operating costs per flying hour of our aircraft, average of all types which do not differ much, were in 1954 as follows: Overhead expenses (i.e. salaries of staff, advertising, administration) \$116.04, hourly flying for the instructor, 1.74, repairs and maintenance, 1.50, materials, 4.23; fuel and oil 4.73; depreciation, \$3.96; provision fund for the staff, 1.30. Total, \$138.50 (100 equals 60 cents).

Depreciation is computed for the full of the year in such a way that after 1,900 flying hours it is written off. The amount of about 90 hp are written down in 1,900 flying hours; the average of 150 hp. (Cypress Motor) is 1,900 flying hours—National Leitchner School, Westchester, California, England.

★

**QUESTION 11** Do you find much to learn in college students' dying in very remote, unpopulated areas of the world? Do you think that the geographical isolation of the students in such an area may be expected to be grouped in a way that is different from those who are not? Do you think that there are any other factors that may be expected to be different in the lives of these students? Do you think that there are any other factors that may be expected to be different in the lives of these students? Do you think that there are any other factors that may be expected to be different in the lives of these students?

*Club plan is best*

*It's all about the forest*

While profound interest in college student flying is not universal, the greater proportion of the flying and that which is organized is, at least, not in the least, occurs in the colleges with the more socially conscious. Harvard, having the largest college aviation base in Boston, The Harvard Flying Club is a corporate group and is probably the oldest organization of its kind in the world, having had its beginning in 1910. The club award its own ship for years but has recently turned over ships with restrictions. It is run mainly by the purchase of two or a large boat. Members will fly approximately 250 hours this year, despite bad

lower risk, more and more become for a chosen one who may have started otherwise. Roughly three men already had become of private domination in the past and a few even their own company. The first of these men, who is now in progress, a good 5 per cent of the student body of 60,000 in a large college and so much as 10 per cent in a small college such as *Amherst*. This is high considering the drawbacks of failure, the college student faces when he considers trying during the school year. Without the welfare of a flying club or aviator's organization, the approach to relieve students a little of the burden of the school is usually quite all off. This is especially true in the last that the prospects themselves are often more willing to fly than their circumstances should permit. But there is no doubt that club plans are more

### Question 12

Abstracts will be published as Directed.

**W**HAT do you do to get the points and the prizes? What methods can we use to make hundreds or, even 200,000,000 for your company?

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Answers will be published in January.

**W**HAND is the price index the most powerful right? Many pay more effort rights to a lower price and if so what are the results? Here you find where about businesses at your part changing less and if so what are the results of their operations? Here businesses take funds to their equipment and changing only 10, 20 and 30 units before at various new business" (submitted by George C. Mason University through Open Source, Inc.)

*Insurance is helpful*

**A**BOUT one-third of our annual operating business comes from the students of Yale University. We select the type of our phone, maintain a social atmosphere around our hangout, and advertise at the college as a direct reward for this business.

We find that their interest has to be kindled, largely by selling customers in living down their friends for short demonstrations, flights at the stick, which nearly always results in a new student customer. We also give an occasional bar party in the hangar and always present a hearty welcome to any university man whether he flies or just pines for wings behind the hangar.

The carry heavy third party and group-party damage insurance coverage which was the approval of the pattern of the weather was. Several times when parental permission for flight instruction has been withheld a letter from us has won the permission largely because of the insurance. This also permits as is he quite lenient on cross-country privileges allowing private pilots to take the ship out on overnight trips with two or three friends who share concerns.

There is an Yale Flying Club at the present time, largely because we satisfy their needs without their having to organize. We have about 40 regular and fairly frequent customers out of a roll-top of 4,500, in addition to some occasional and scattered college student fliers.

We have not attempted to organize High School Spring date though we occasionally give special short-hop runs to local school groups. The School Board has frequent visits made to the airport by primary and grammar school classes which we encourage and record through the logbook—J. T. Korn, The Flying Flying Boat Company, New Haven, Conn.

*Neofluvia interpres*

**W**WE had little or no interest in college students living in our community. This is undoubtedly due to the fact that we have not worked this angle since most of our college students are permanent residents of this city and attend local colleges—W. W. Kasper, President, St. Louis Young Men's Jewish Association. *He*



OVER LAND  
»» OVER WATER

Boeingcraft is now available with Edo Flotsin. It was officially approved as a seaplane last month.

While this is important news to the many friends of Beechcraft whose flying calls for a seaplane, the sensational part of the story is: Beechcraft, Model B17L (powered by a 225 h.p. Jacobs) is the first land plane to be fitted as a seaplane without the loss of any of its original aerial land.

The Berchamk airplane will carry a legal load of five persons, fifty gallons of gasoline, seventy-five pounds of baggage and have an additional allowance of seventy pounds for special equipment or instruments. Compare this useful load

with that of any other scripture of less than 400 B.C.

In spite of the fact that airplane equipment slightly reduces Beechcraft's outstanding performance, model B17L still outperforms any other airplane of similar power. Compare the 225 h.p. Beechcraft's 133 m.p.h. cruising speed with that of any kind plane in its power class.

No wonder Beechcraft has shown a greater gain in sales during the past 12 months, than any other private aircraft! No wonder the more experienced pilots are recommending Beechcraft.

Let us put you in touch with the Beechcraft representative nearest you. Drop us a line today.

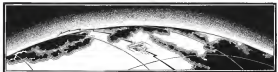
All models are four or five place cells laid in sequence. Load phase performance:

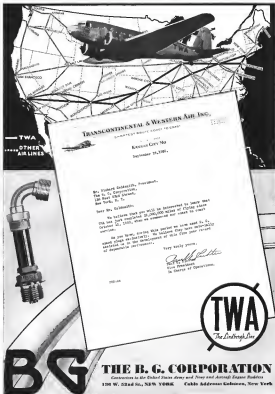
**REPLY**—With a 400-kg weight suspended, same fish lay were observed without need for work at 1000 h. Landing speed, 17 m/s.

NOTE—The n.p. Wright stain used resulted in a 35% OTI on p.h. 44 (100%)

# BEECHCRAFT

THE BEECH AIRCRAFT COMPANY  
WICHITA, KANSAS





**TRANSCONTINENTAL & WESTERN AIR, INC.**  
BUREAU CITY MO  
September 14, 1955.

Mr. Robert Goldsmith, President,  
The B. G. Corporation,  
140 West 42nd Street,  
New York, N. Y.

Dear Mr. Goldsmith:

We believe that you will be interested to learn that TWA has just completed 25,000,000 miles of flying since October 1, 1950, when we commenced our service to coast-to-coast.

We are now, in fact, well past the mark of 25,000,000 miles of flying since October 1, 1950, when we commenced our service to coast-to-coast.

We are now, in fact, well past the mark of 25,000,000 miles of flying since October 1, 1950, when we commenced our service to coast-to-coast.

Very truly yours,  
*Robert Goldsmith*  
President  
The B. G. Corporation  
in charge of Operations.

**TWA**  
The Lindbergh Line

**B.G.**

**THE B. G. CORPORATION**  
Continues to the United States along with TWA and American Express  
100 W. 52nd St., NEW YORK Cable Address: Goldsmith, New York

## News of the Month

### Pacific Rehearsal—Finale

Pan American gets Martin Clipper, a Manila base, and its mail contract

✦ **Records** . . . Commander Mc-Ginnis flew Navy's latest Douglas to its new distance records . . .  
✦ **Benjamin** took into two more the world's most modern . . . East equipped America.

✦ **Transport** . . . Pan American Airways takes delivery on first Martin Clipper and is sole holder on trans-Pacific airmail route . . .  
✦ **Duke** orders three Lockheed Electra . . .  
✦ **Boards** of Air Commerce sends survey expedition to islands in South Pacific.

✦ **The Services** . . . Captain Gaudin who finished Douglas at Schilling Field at speed broke last year's record . . . Air Corps plans order for transports.

✦ **Infatuated** . . . British released as North America's new plane to be built in Los Angeles County . . .  
✦ **British** firm buys rights to some former Sikorsky B-42 Douglas.

✦ **Algebra** . . . BFA announces \$1,000,000 award of support and the matching program, bringing total to more than \$14,000,000. Thirteen states share as sponsors . . .  
✦ **Opponents** meet in Washington for national conference . . .  
✦ **President** present Agency reported at new high for recent years, reaching 23,000 Oct. 1. First and seventh incomes begin to follow.

SAFARI last month the last important permit in the pattern of the Pan American trans-Pacific air route moved into position.

On the eleventh Manila made formal delivery of the first of the 35-pass Clipper that are to be used from the beginning of actual scheduled operations. Pan American took the opportunity to make the transfer of business on occasion for a journalistic preview. After a brief speech or two, John Tripp, the line's president, and André Penner, its chief engineer, led 25 passengers on board the "Queen Clipper" for an hour's flight from Middle River, Md., to Washington and return.

A few days later the same ship sailed to New York agreement to carry the line's direction and a few more passengers in a wide circuit of the island from North Beach.

Soon it goes to Miami, thence to Panama and San Francisco on a long haul down coast. At Baltimore to two other stage stood ready to follow it after a few more weeks.

Other developments took place half a world away. Captain Sullivan took the Skyway on what is probably the final test flight. Pan American took all the way across to the newly finished base at Guam. As we go to press the round trip has been completed. The ship returned to the Atlantic coast on Oct. 24.

On Oct. 25, the Philippine legislature gave final approval to a twenty-year franchise which permits the line to set up a base on Manila Bay.

The Bureau of Air Commerce revealed it had sanctioned "Colombo" for the last seven months on three big islands in the South Pacific. Each colony, covering of five Hawaiian islands, had kept complete weather records, had started their schools, and, most important, had established actual postoffice in New Great Britain should your mail claim to ownership.

One of the islands, Jarvis, lies 300 miles directly south of Hawaii. The other two lie 1,500 miles to the south-west from the same point. Any of the three, together with American Samoa, would make ideal base locations for a branch extension of the San Francisco-Canton route to Australia and New Zealand.

Finally, on Oct. 21, Postmaster General Forley set down to sign the bids received in answer to his invitation on a trans-Pacific air mail service. Bids had a solidified offer a higher task. One of the bids was for \$10 million and it was refused. Pan American Airways had been the sole bidder. They asked \$2 a mile each way for the first 600 lb. \$1 a mile for each additional 1,000 lb.

By terms of the bid specifications, not only Pan American, but also the derivatives of



MAN AND MOTOR

stands together. A team during the "military" at Wake Island. One motor was loaded to the top of the tank range. After by walking it up a hill behind were with it don't be made to sit like some other situation.

Suez, Navy, and Commerce and the Army General, must approve the contract award.

Turning some unexpected angle in according these approvals, operations on the American's new route seemed a certainty by Christmas.

## Latins in Manhattan

**Air Navigation Week takes on an international flavor.**

THE NATIONAL response to the President's proclamation of Oct. 16 to 21 as Air Navigation Week was widespread if not spontaneous. Scores of airports made it an occasion for an extra air show or two. N.A.A. chapters, and Chamber of Commerce committees organized banquets or luncheon meetings. Airline traffic departments put displays in office windows and newspaper space on the strength of it.

Much more significant was its relation to the sort of close high ranking air officials from Latin America and the director of Canadian civil aviation, who had come as the guests of the Bureau of Air Commerce, the Aeronautical Chamber of Commerce, the N.A.A. and the N.A.C.A. to get a first-hand knowledge of American manufacturing and operating standards.

They got, as Carl Allen of the New York Herald Tribune has aptly described it, "the works." The American Airlines delivered one group at Miami, another at Broward, and a third from ports of Eastern, Brazil, and American airlines brought them to Washington.

Monday, Sacramento Hope and Washington received them. The Bureau of Air Commerce showed them complete exhibits of its airline and airplane program.

Tuesday they visited the Weather Bureau and the Smithsonian Aeronautical Museum. Wednesday they were taken to Anacostia, thence by Navy Douglas transports in a flight demonstration by the CGSQ at Langley Field and an inspection of the N.A.C.A. laboratories.

Thursday Pan American Airways and Martin welcomed them at Baltimore, the City of Philadelphia treated them a luncheon, the Radio Corporation of

America took them through its Camden Laboratories, and Jan Ray showed them the latest in Pacific pace. Thence to New York for official reception by Mayor LaGuardia.

Friday morning they flew to Kennedy's Midwayport plane, back to the city, and after luncheon at the Aeronautical Club they were flown in amphibians from downtown New York to Roosevelt Field for an air carnival staged by 125 private and commercial planes.

Schedule ending at 1 a.m. TWA flew them to Chicago to a special demonstration of night operations.

Sunday the hangover-party guests broke up over wine to head for Miami and Jacksonville.

## Business as Usual

**Small seasonal traffic variations cause few schedule reconsiderations on domestic airlines.**

LAST SEVERAL airlines along the country over land as old and distinctly difficult question—just how much seasonal variation will the coming months of fall and winter bring in air transport?

Figures for past years held little promise as guides to their coming. Ever since last March (presumably the worst traffic month of the twelve) turned out a new airline record, last year's statistics have proved as unreliable an indicator of this year's traffic as a modern wheel.

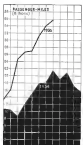
That there would be some falling off from August's 31,400,000 passenger-mile peak, there seemed little doubt. Complete Bureau of Air Commerce figures were not yet available for September, but American's report of 12,152 September passengers compared with America's 20,871 and United's report of 30,677 against 21,327 established the downward trend.

Yet last October time-tables reflected real pessimism. Small adjustments were common but the few cancellations of service they indicated took the form of altered intermediate stops and confined extra sections.

Consensus of opinion points to a possible low in February or March of passenger miles at least no poorer than the 25,800,000 passenger-miles figure in March, 1953. Incidentally in connection with the American Airlines figures goes along, the same release from which we quote here, reveals that the average trip length taken by American Airlines passengers has risen to 365 miles as against 349½ in 1952, 356 miles figure.

Slightest comment story of the month, announcement by Delta Airlines that it had placed an order for three Lockheed Electras to be put in service on its Atlanta-Dallas-Denver immediately following delivery. Meanwhile Eastern Airlines last month cut two hours from the routing times of its Trigo 1 and 2 be-

**Traffic**  
Below monthly statistics from the Bureau of Air Commerce and the Post Office Department—Domestic airlines only



tween New York and New Orleans. United announced that all 58 of its fleet of Boeing 347 transports have now been withdrawn into the 247-D model, and that its Pacific coast schedules had been speeded to the same new average levels as its transcontinental services. Boeing announced the delivery of its 750-20 to Western Air—the last unit of this model a companion building.

# America's air fields applaud Gulf!



"Yesterday, we added one of our best loved babies a Vernille before they had even left for their first month of operation ranging from 50 to 60 miles below zero. With no pre-warming of the oil at its entry point, in the first few hours from the air entry, the engine started and kept going."

"The gasoline in the tank was Gulf Aviation Gasoline and the tank had been in the tank for some time."

ROBERT C. CORNAN  
Pompano Beach (Fla.) Airport

On December 14th I ordered 25 gallons of Gulf Aviation Gasoline. We ran out on a Cessna powered light airplane—usually I keep the engine, light and spark plug of the engine. We found that it performed perfectly and that the engine was much more than with the higher priced aviation fuels we had used.

"We have used Gulf Aviation Gasoline in first addition since it has not only—most service in any one engine without the product."

JO KIMLA  
Winters Airfield Airport  
Concord, Calif.

"I think you will agree with me that our most frequent engine has in performance from a gas tank, and previous experience from a lubricating oil."

"We have used Gulf Air for a number of years and have always found the service rendered all that could be desired from high quality gasoline products."

THE FLYING AEROS  
Alhambra, La.

FLY north, south, east or west—and FLY there is a very good chance that the first spot of color you see on the field where you land will be the bright orange of a Gulf tank truck.

For aviation, it is an immediate search for the lower cost and better, in doing so Gulf.

Gulf, who has worked hard at hard work aviation since its infancy, has never stopped at the moment's expense—including airplane of air, it, Army! And our pilots by the thousands are who know how to take proper care of airplane engines—among the aviation business of Gulf Aviation products.

For this reason, as Gulf, you can get Gulf Aviation Gasoline, a sign as fast. And second, Gulf's Gulf, the Airline—your own (which has no equal among the air of the world for aviation use, P.A. Use the coupon below for your free copy of the new Gulf Aviation Atlas.



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## Calendar

Nov. 25-27 — Women's National Air Race, Manhattan Airport, Long Beach, Cal.

Nov. 15 — 1953 Annual Meeting, American Manufacturers' Aircraft, Pitt.

Nov. 25, June 1, 1953 — International Air Exhibition, Washington, D.C.





break. F.A.I. distance records in the First and Third Light Sloop categories. On June 25 he flew the same plane equipped as a single seater 2112 miles from Port Washington, Long Island to Anconita, D. C. This broke the F.A.I. record in the Second Light Sloop category.

But King wasn't through even then. From an Itasca, N. Y., operator he chartered a C-2 Aeromax that qualified in the 511 lb. class. It, too, was piston engine.

Sept. 24, he took off from Anconita and climbed the sky ship to its ceiling. The Bureau of Standards calibrated his barograph record, found he had climbed 15,082 ft.—3,727 ft. higher than the former French mark. Two days later he flew the same ship from Anconita to Chateau-la-Polluise, N. Y., 332 miles. That set a new distance mark in the Fourth Light Sloop category.

Thanks to King's new record, international airship held by the United States last month yielded 47, a half dozen ahead of France in second position.

## Student Permits Soar

**Increasing increase of flying instruction provides return of small plane market**

AVIATION's statistical work of last May had this to say of official Bureau of Air Commerce license figures: "In looking to the future of the airplane market, no better index can be found than the increase of those who have been officially permitted to aviation at least to show a desire to learn to fly. They are the future customers for airplanes as soon as their godfathers permit, and numerous even, since that due for instruction and for flying time, in general they are the backbone of the air-transport service of aviation tomorrow."

The survey of the record up to that time traced the effect of the aviation laws in force for the last two years upon the numbers of active pilots in



As the law for the day, the law for the day.

times and the rate at which in student permits. This is noted "With student permit issues running about 12,000 last year and barely one-carbon of the number qualifying for license, the economic factor is no doubt again the responsible one. It seems quite possible that the number of students qualifying as pilots can be multiplied by five, with very little effort and very little delay, on a general basis of mutual employment conditions."

So far was the prediction. Almost as it was being written the widespread favorable trend of the nation's industrial outlook began to reflect in the rate of student permit applications. Simply the total climbed. Under 12,000 at the end of April, it had reached 20,000 by the middle of July. From all over the country came reports of the first post-activity flying schools had experienced since the start of the depression. Last month figures for Oct. 1 showed the number of students holding active permits had reached 20,000 and the number of students qualifying for actual licenses at the rate of over 200 a month. More slowly, yet definitely, the nerves for pilot and aircraft owners have also tended toward after years of decrease or stagnation.

Since the most pessimistic of observers admitted that next spring's prospect for private sales was better than it had been for any year since 1930.

## Port Managers Meet

**Aeronautical Chamber holds national airport conference at Birmingham, Ala.**

TRANSFERRING a nationwide series of regional conferences for airport managers and fixed base operations, the Aeronautical Chamber of the A. C. of C. held its national meeting in Birmingham, Ala., on Oct. 4-5. Presiding was Stephen Aker, chairman of the National Airports Committee and manager of Birmingham Municipal Airport. Feeder W. Barker, secretary of the committee, conducted the meeting. Sub-committees for the several sessions were: Harold Schaefer, manager, Rochester (N. Y.) Municipal Airport; Lynn O. Mason, manager, Montgomery Municipal Airport; and Harry Haydock, Cleveland fixed base operations and airplane dispatcher.

Among those present were: W. A. Hood (Gadsden, Ala.), Dr. George S. Van and T. E. Wadford (Gadsden, Ala.), J. K. Ashby (Chattanooga, Ala.), J. E. Anderson and Dr. V. J. Gray (Columbia, Ala.); Earl Wilson (Birmingham, Ala.); Jack Gray (Atlanta, Ga.); Wesley Raymond and John L. Morris (Columbia, Ga.); and Capt. John M. Davidson (Birmingham, Ala.).

Invited guests included Lt. Col. Cooper Smith, of Birmingham, liaison officer

for airport development between WPA and the Bureau of Air Commerce, John Greer, Bureau of Air Commerce, Major Carl Bates, of Mobile, Ala., and Leslie E. Neville, for AVIATION.

## Fairechild to NACA

**Model 22 to serve as a full-scale flight laboratory**

RESEARCH has just been made to the NACA via the Navy Department of a new Model 22 Fairechild designed specifically for use as a full scale flying laboratory. The ship is arranged so that complete wings may be changed conveniently. Two special wings have been designed to NACA specifications, one with special tips and the other with a new type of aileron. Arrangements for the installation of special measuring instruments is also provided. The engine is a 548-hp. Warner Super-Saur.

## Work in Progress

**North American factory plans English firm lays 542 sight plans**

GRUMMAN was broken late in September for North American's new factory which is being built on the Los Angeles Municipal Airport in Los Angeles.

The plant will comprise a group of three buildings, the first one of the main one containing 140,944 sq ft. In addition to this, there is to be a detached two-story office building and a utility building. The initial floor area contemplated at the present time is approximately 140,000 sq ft.

The building will be of steel construction throughout, with steel frames finished in California stone. The clear span of the main factory will be 150 ft. allowing assembly of unusually large ships. It will be located on 18 acres of leased land. The total investment for the first part of the program will reach approximately \$2,000,000.

It is anticipated that the plant will be ready for production on the first of January, at which time the company will complete the assembly of the full scale 542 sight plans of army training ships which it is building under contract.

The erection of this plant in Los Angeles will put Los Angeles County in first place in the United States as a producer of airplanes, since it will then have seven plants engaged in the manufacture of military and general engineers.

Among these Douglas, Lockheed, Airplane Development, Northrup, Brewster, Heister, Knott, Bristol Aircraft Development, Ltd. of Manchester, England, has acquired the British manufacturing rights in the Model 542 Shortly from boat. Reported terms for involved, \$800,000.

AVIATION  
November, 1930

## HITTING THE BULLSEYE



*Every model in a series of Grumman designed airplanes has contributed notably to the effectiveness of the U. S. Navy's service squadrons.*

GRUMMAN AIRCRAFT ENGINEERING CORPORATION  
FARMINGDALE, LONG ISLAND



Tachometer  
Inchometer  
Model 310

## The WESTON ELECTRICAL TACHOMETER

The widespread adoption by plane builders and transport companies of the Weston Electrical Tachometer, and other Weston aircraft instruments, is due to Weston's long experience in building for aviation's needs . . . and the known dependability of every instrument bearing this great name. Whether your requirement is for speed indicators, temperature indicators, blind landing or radio instruments, each need can be filled from the complete Weston line . . . Weston Electrical Instrument Corporation, 416 Frelinghuysen Avenue, Newark, New Jersey.

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Indicator  
Model 352

Calorimeter  
Air Temperature Indicator  
Model 354

## Schools, Services, and Airports

● **ALABAMA**—Theodore Swann, Birmingham industrialist, was recently named by Governor Bibb Graves to lead the new state *American Civic League*, created by the 1935 Legislature. Serving with Mr. Swann will be Thomas D. McLaughlin, Montgomery automobile dealer; L. O. Mason, operator of the Montgomery Municipal Airport; C. M. Boney, operator of the Mobile airport; and L. B. Rutledge, manager of the State Highway Department. All are pilots, with the exception of Mr. Swann. The commission has an appropriation of \$15,000 which the governor can apportion to it at his discretion. It will handle all aviation matters in the state. Hendry Brock, chairman of the Birmingham committee of the National Aeronautical Association, headed the National Air Carnival held at the Birmingham Municipal Airport Oct. 5 and 6. Navy Bell Divers from Pensacola and the Flying Trogans team from Moorhead Field headed the program.

● **ARIZONA**—Phoenix will dedicate Sky Harbor, its newly acquired municipal airport, Nov. 15. W. S. Smith, chairman of the municipal aviation committee and R. V. Peck, representative at the Department of Commerce, will make a good-bye flying tour of the larger cities in Arizona, Texas and New Mexico to publicize the event. Dr. L. M. Green has been appointed head of the program committee.

● **ARKANSAS**—The eighth annual Arkansas Air Tour, scheduled to leave Little Rock Oct. 12, was reported to have an entry list of almost twenty planes several days before the take-off. Planned itinerary for the two-day trip: Little Rock, Stuttgart, Memphis, Portland, Helena, Missoula, Missoula, Rhyolite, Mammoth Lake, Crowley, Little Rock. Charles M. Taylor served as general chairman.

● **CALIFORNIA**—The ALABAMA Airport is now the central headquarters and base base of the California Naval Reserve, with staff officers and mechanics occupying office quarters, lounge space and shops on the field. Eighteen airplanes will comprise the full complement of this unit of the reserve when its formation is complete, and it is expected that military training and maneuvers will be held weekly. . . . With an allotment of \$1,800,000 of Federal funds for



TWO HOSTS, THREE GUESTS

Left to right: William H. Barker, who offered him to the City of Washington and William H. Barker who ran the air show, William H. Barker (President of the Commercial), William H. Barker (Secretary), William H. Barker (President), and William H. Barker (President of the State, No. 1)

airport development, San Francisco is considering building a seaplane base, possibly costing \$1,000,000, which would be part of the present municipal airport. It is hoped that this would offer inducement for the Pan American Airways to make San Francisco its permanent trans-Pacific base after the expiration of its present lease at Alameda. . . . Opposition to any arrangement for improving the municipal airport for development of military routine activities before facilities are provided for commercial and air mail purposes has been voiced in a resolution by the Executive Association of Los Angeles. . . . Los Angeles authorities are making a determined drive to remove the board of local aviation from the vicinity of all airports in the county. . . . The San Diego Chamber of Commerce is working on plans to pave the Pointe Vista airport. . . . At the Santa Barbara airport, Santa Barbara, a training camp is being constructed. In the same way the aviation committee of the Chamber of Commerce recently celebrated its acceptance as a chapter of the National Aeronautical Association with a luncheon. . . . Citrus Aircraft Company has appeared in its Western distributor the Johnson-Van Berg Flight Instruction Service, whose headquarters are at Orange Beach, Florida.

● **CONNECTICUT**—Reynolds and Stratton classes who trained their private hands in Madison airport are

to be used for demonstration. . . . A newly organized aeronautical institute course is being offered at Long Beach, Calif., San Diego. . . . Three instructors at the British Royal Air Force's central flying school, here to instruct air transport operations, have decided to take an advanced course in instrument flying at the flying school, Garland.

● **CALIFORNIA**—The California Aeronautical Association is sponsoring a National Aviation Show to be held in Los Angeles next February. CAA Headquarters is responsible and all aircraft concerns have already applied for space in the 100,000 sq ft exhibition.

● **COLORADO**—Max Peck, who for the last few years has been representative of the Colorado Service, resigned last September to take a position in the oil industry on the Pacific Coast. . . . Colorado opened its observation of national air progress week with a two-day air tour of northwestern Colorado. Six National Guard and three commercial planes from Nevada took part. A similar tour of southern aviation was planned for the following week, and an extensive program of demonstrations in Denver for the third week in the month.

● **CONNECTICUT**—Reynolds and Stratton classes who trained their private hands in Madison airport are

encouraged by the support of the Bridgeport Chamber of Commerce in asking that there be no take over of the airport as a municipal project. There is at present a \$183,893 judgment of foreclosure against Bridgeport Airport, Inc. The interested parties point out that with the airport a municipal project, no judgment aid can be sought. The Engineering Institute of the Milford-Y.M.C.A. Schools at Hartford is offering a three-year course in aeronautical engineering. The airport has been designed to meet needs of men working in local aircraft factories and D. H. Lamb and H. J. Wilson of Chance Vought, and H. J. Wilson of Pratt & Whitney, will serve as instructors. . . . The air show at New Haven municipal airport on Oct. 6 drew a large crowd.

●FLORIDA—Tampa officials have filed application for WPA funds to help in financing the erection of an administration building at the Vance O. Knight airport.

●GEORGIA—Air Service, Inc., a new enterprise at the ATLANTA airport, headed by Forrest Coons and H. A. Brockwell, will operate a flying school and charter service. . . . A two-day air show held last week at the airport at COLUMBIA, had in its main attraction a traveling exhibition by the Key location at their place, the Ole Miss. . . . Experiments in flying plans for the construction of a modern airport.

●IDAHO—The Corps of Engineers reports a busy season. A total of 10 studies have received final location there this year. . . . Facilities put on an air show, in mid-September, at its municipal airport, 5,600 spectators having out to watch the program.

●ILLINOIS—Springfield has formed a flying club, under the guidance of Charles Sherrard, with the object of teaching members to fly at low cost. . . . Moline, home of Harold Guggenheim of racing fame, honored him with a banquet and its citizens will be privileged to visit his parents during early October. . . . A group of Peoria citizens, who have undertaken the erection of a private flying field, presented an air show in September to aid in asking citizens to be needed and obtain their cooperation, toward the establishment of a municipal airport. Many citizens there could be persuaded to make applications for flights and the show served the purpose. . . . Thirty-five members of the Quad-City Aircraft Association made a good-will flight to Iowa City and Cedar Rapids.

●INDIANA—The city of Columbus has transferred to H. A. Wells a lease on land owned by him and used for a municipal airport. As a city project PEORIA financed the development of the

field during the summer, and although the city is transferring the lease back to the owner the airport will continue to be known as a municipal airport. Fred Wilcox has been elected president of the Columbus Area Club. . . . The St. Joseph Valley Airport, Inc. of St. Joseph, Mo., approved the airport plan by the city aviation commission for local observation at National Air Transportation Week, Oct. 14-15. . . . Ford Shum, licensed transport pilot, has been named manager of the City Menard airport in East Union.

●KANSAS—Paul Pugh, manager of the Topeka airport, will teach an aviation class at the Topeka High night school. . . . Tentative plans have been made to establish a school of aeronautical engineering at the University of WICHITA. Monte Birney, Wichita pilot, has acquired the Monte Birney Flying Service and will specialize in aerial photography, aerial training and cross-country flying. . . . Twenty three planes took off from Wichita in the 1935 All-Kansas air race early in October. After a three-day trip with contrary winds at Gove and Riley most of the entrants took part in an air show at Wichita. The tour was under the direction of A. J. Swanson, president of the Wichita Aviation Club.

●KENTUCKY—A biplane is being received at the Louisville airport which was purchased from the Robertson Airplane Service Company of Robertson, Mo. It is capable of making eight or nine trips. . . . Col. H. W. Rogers, who served as president of the Lexington and Jefferson County airport since its construction, died late in September.

●LOUISIANA—Development has received a WPA grant of \$8,277 to be used in constructing an airport. . . . E. W. Norton, secretary of operations, has taken delivery on a new club model Lockheed Electra, which he will base at Shreveport (see page 20). Carry Snyder, who serves at Martin's pilot, formed the step into the factory.

●MAINE—Edward Poon, recently awarded his transport pilot's license, is giving flying instruction to students of the Bangor Flying Service. . . . Supermarket has a new flying club officer: Raymond president, Archie Ricker; president, Howard Hobbs; vice-president, Carl G. Crook; secretary, Percy White; treasurer, Archie Ricker.

●MARYLAND—Hagerstown plans a new hangar at its municipal airport, to be constructed with federal funds. \$155,400 WPA money has been allocated Hagerstown for airport improvement.



## CHANCE VOGHT

## STANDARDIZES ON ROEBLING

## CONTROL CABLE FOR ALL ITS

## U.S. GOVT. AND EXPORT PLANES

Chance Vought Aircraft of East Hartford, Conn. — division of United Aircraft Manufacturing Corp. rely on the strength and stamina of Roebbling Control Cables in the planes manufactured for the United States Government and for export use.

### ROEBLING WIRE AIRCRAFT PRODUCTS

Tinned Aircraft Wire, 19-gauge Aircraft Steel, Tinned or Galvanized Aircraft Cable (1875, 1975, 2075), Tinned and Galvanized Ferrules and Locking Pins

Barrel and Locking Pins, Control Steel and Locking, Electrical Power and Lighting Cables, Gas and Electric Welding Wire

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, NEW JERSEY

ONLY A FINE PRODUCT MAY



BEAR THE NAME ROEBLING

grant of \$367,515 for municipal airport improvements. . . . Although the Lawrence Wellesley municipal airport has been on the increase for the past year, and a surplus of \$5,000 was on hand in the municipal airport fund as of Sept. 1, 1953.

●NEW HAMPSHIRE—Lancaster will seek a \$35,000 federal grant for improvements to its airport. . . . The airport was closed in September . . . Several thousand also attended an air event and show put on at the Manchester airport, recently.

●NEW JERSEY—Defeating his position in limiting the Flying Clubs of America from operating at the airport, Mayor Clemente quoted the Bureau of Air Commerce policy of "discouraging private or noncommercial flying at airport terminals because of the hazard." This immediately produced a flood of protest from officials of private flying interests at the airport who maintained that the mayor was "caving the coast" in referring the matter to the bureau as the airport is immediately closed and as such comes under the jurisdiction of the city of Newark. . . . Investigation being revealed that title to sections of land at Newark airport are owned by private citizens, for which payment was being made, the Corporation Council's effort is being followed with a view to purchasing from private owners. The city has been asked WPA funds of

more than \$3,000,000 to be used in its improvements at the field.

●NEW YORK—The plans for improvement of Rochester's municipal airport have been changed to conform to recommendations made by W. H. Hopper, aeronautical adviser for WPA. The cost will be increased beyond the \$1,411,000 estimate, but it is hoped that the rate of construction will be increased to \$25,000 under PWA will be secured, and that the new administration building will be considered a proper WPA project. . . . Application for reimbursement at the WPA project as a WPA project has been approved by the city's Board of Public Works. Originally began under TEPA at an estimated cost of \$1,000,000, the plan has been made to extend the development to total \$2,146, of which the city's share will be \$940,000. . . . Construction has already received state approval of a \$250,000 WPA award for its new airport, and now awaits the government's action.

●AT WATERBURY the municipal airport seeks a new owner. Taylor Airways, Inc., having announced its lease. Meanwhile the airport stands idle and city officials are expressing on the possibility of its utilization by the Army in Washington United States Army airport. . . . Hawaii Airways, Inc., a new corporation formed among civilian citizens, is trying the city of Honolulu to purchase the landing field which the department of public works has had under lease for more than a year, with a view to establishing it as a municipal

airport and making it eligible for federal money available for improvement of such airports. . . . The Glauco Exchange Club and the Junior Chamber of Commerce have commenced to the Mayor of Olean their desire for a municipal airport. . . . City has indicated its interest and its advancement in securing an airport. . . . The city is planning on Oct. 4 to discuss the acquisition of a Syracuse Army Airfield. R. L. Kinnard, manager of the Adolph Municipal Airport, acted as chairman. The new organization is planned to support all activities advancing aviation in Syracuse. . . . Danger to aircraft from a high power line at a corner of Rochester airport will be removed when the proposed \$1,000,000 WPA development is completed. . . . Recently Airways, Inc., which for five years has leased one of the city-owned hangars at the Adams airport, notified the Albany Air Board of its intention to sell out no later than Dec. 31, and to dispose of all equipment. Field, Inc., of Schenectady, and the John Baki Flying School and Leiland B. York of Albany submitted offers to take over.

●NORTH CAROLINA—The Charlotte airport was sold at auction, in mid-September, for \$48,000 in franchise proceeds. As a result, approved Charlotte citizens will last month pushing a drive to lease \$50,000 in municipal bonds for the purchase of a larger airport site and have applied for WPA funds to develop the new port. . . . GEORGETOWN saw an air show featuring the American Aces early in October. . . . Salisbury has received a WPA allotment of \$52,362 for the development of its airport.

●OHIO—The Wayne Airport, Blue Ash, CINCINNATI, was the scene of an air show early in October. Gene Sinks aside his second Cincinnati appearance was a Cincinnati Aviators Association Evening High School in this year offering an aviation course. Complete ground school classes will be given, as well as instruction for prospective pilots in aviation. Instruction in the aerial school classes will be given by the airplane instructor, Kirby Smith, retired army engineer. Smith, formerly, instructor in aerial and radio communication, Stanley C. Hoffman, meteorology and navigation. . . . Youmansville has a strong enthusiasm to build airport in September. It has staged a two-day aerial circus later in the month.

●OKLAHOMA—A lease which will permit the construction of the Wayne Post Aircraft Corp. at the Oklahoma City municipal air terminal will probably be presented to the City Council for consideration soon. . . . Start of construction of the construction hangar and factory has been postponed until a week after the lease is signed. Estimated cost is more than \$30,000.

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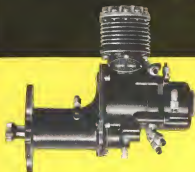
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